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New Plant for Making Cold Punched Nuts

Economical Production of the National Screw & Tack Company, Cleveland, in a Highly Specialized Modern Factory with Interesting Machinery Arrangement

An interesting type of a highly specialized manufacturing plant along the line of modern factory construction is found in a new factory building that has been completed by the National Screw & Tack Company, Cleveland, Ohio, in connection with its No. 1 plant. It permits the entire separation of the company's nut and bolt making departments. With the exception of a portion devoted to machine shop and toolroom purposes, the new building will be used exclusively for the manufacture of cold-punched nuts, the product being principally hexagon nuts. When the company found it necessary to increase its manufacturing facilities, it decided to relieve the overcrowded condition of its No. 1

plant by erecting a new building for its nut department and to use the old building for making bolts. While the new building was erected as a separate unit, convenient access to the bolt works was arranged for by a covered bridge on each floor. These covered passageways start from a stairhouse on one side of the new building near the center and connect with the storage warehouse between the two buildings as well as with the bolt works.

The nut works is a five-story skeleton steel frame, brick and concrete building, 54 x 212 ft. in plan. An interesting feature of its construction is that it was designed to carry the load of heavy closely placed machinery on the different floors, and

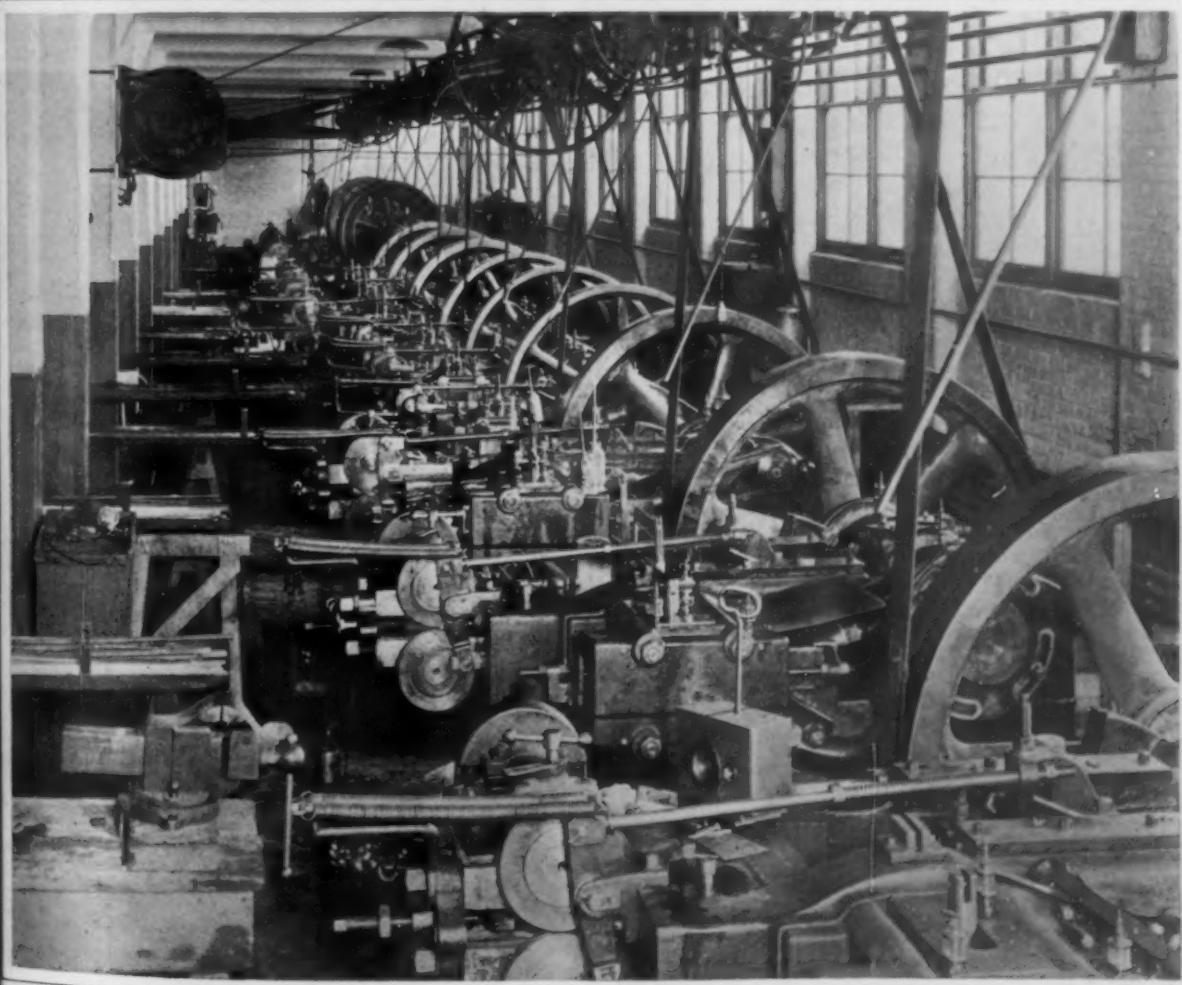


Fig. 1—View on First Floor Showing Waterbury Farrel Foundry & Machine Company's Heading Machines

also to provide that there would be no vibrations from machinery in operation. A reason for providing a building of more than ordinary strength is that the finished stock of nuts is about 50 per cent. heavier than the same volume of finished bolts. The floors are proportioned to stand a safety load of 650 lb. to the square foot.

Two rows of interior columns extend the length of the building, spaced 10 ft. between centers lengthways, and spaced slightly over 17 ft. between centers crossways, dividing each floor into three bays, each bay being approximately 17 ft. wide. The columns are built of 12-in. Bethlehem sections inclosed in concrete making the finished column 16 in. square. The exterior columns are inclosed in concrete and covered with brick, making a 2-ft. structural pier every 10 ft. on the sides and every 17 ft. at the ends. The entire outside, except the space occupied by the columns, is window space. The outer walls are faced with shale brick. The columns support 20-in. 65-lb. steel beams laid crossways in the building and spaced 10 ft. between centers and from these beams are suspended reinforced concrete floors 12 in. in thickness. On 8-in. concrete slabs are laid 2 x 4-in. wooden sleepers spaced 10 in. between



Fig. 2—View on the Fourth Floor Showing Special Drilling and Tapping Machines for Hexagon Nuts

centers. The sleepers are bedded in concrete and the spaces between them are filled with concrete. The top is covered with $\frac{3}{8}$ -in. x 2-in. maple flooring. The wood flooring is laid throughout the plant except under the lavatories and in the toilet rooms where cement floors are used.

The ceilings are all 13 ft. $5\frac{1}{2}$ in. in height, to conform with the construction of the bolt works and warehouse. The windows extend from the bench level to within $\frac{1}{4}$ in. of the ceilings so that the maximum amount of outside lighting surface is provided. Clear glass windows are used and the frames and sash are wood.

The stairhouse previously referred to has iron stairs and cement floors, and on the outside of the building

at the south end is a wide iron stairway that is connected to each floor by double doors. This stairway provides a fire escape and is used by men while at work during pleasant weather. The doors leading to the stairs have no locks, being fastened on the inside by slide bolts. While practically no wood is used in the construction of the building, except for the floors, window frames and sash, an added precaution is taken against fire by the installation throughout the plant of an auto-

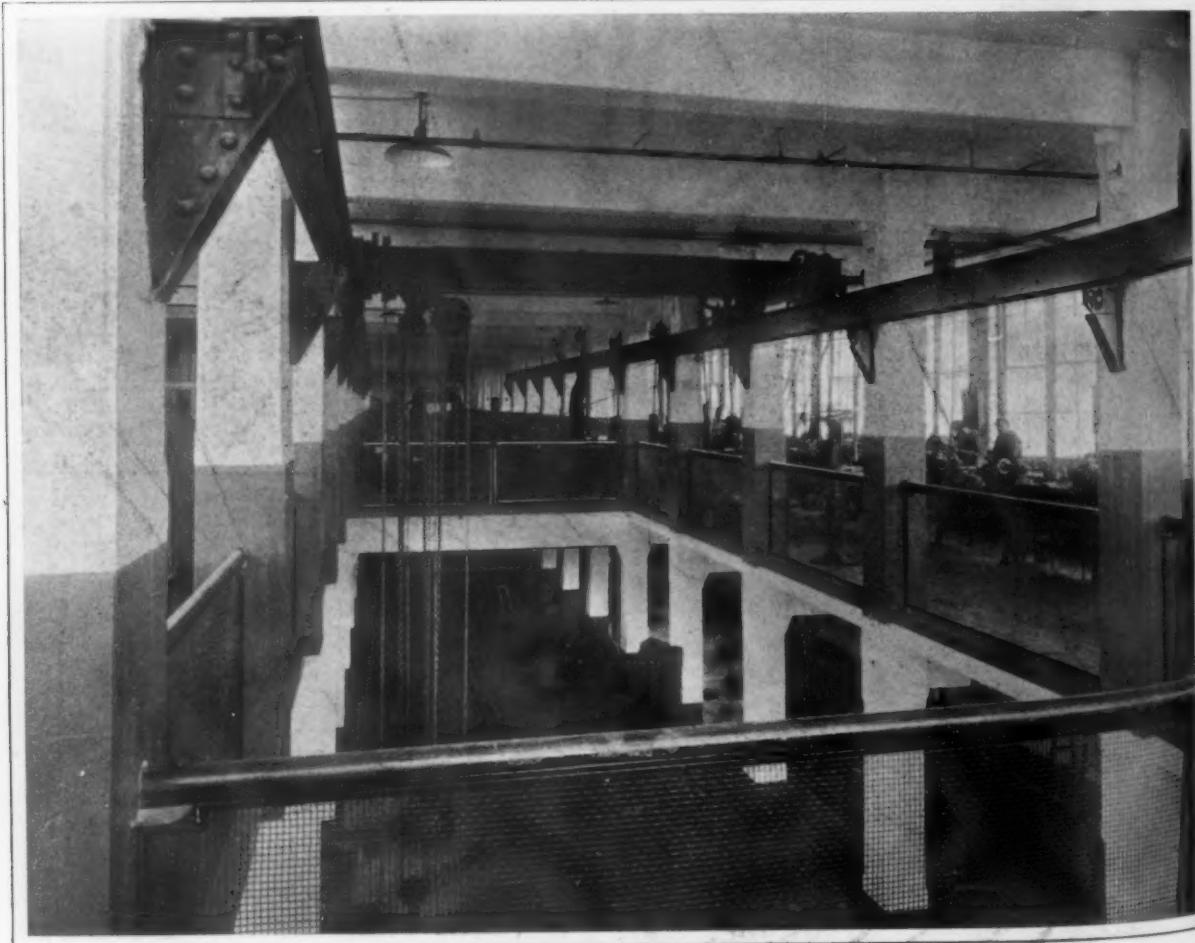


Fig. 4—Building Arrangement for Machine Shop with Hatchway between First and Second Floor and Hand Traveling Crane

matic sprinkling system made by the General Fire Extinguisher Company. All of the floors are served by a 4-ton 8 x 10-ft. Otis electric elevator. The interior wall surfaces are painted white with the exception of the lower parts of the columns, which are green up about 5 ft. from the floor.

The artificial lighting of the building is provided by means of 150-watt clear Mazda lamps spaced 15 ft. each way in the 10 x 17-ft. bays, in a staggered arrangement. The lamps are equipped with 18-in. Abolite reflectors and are placed 2 ft. below the ceiling. In addition light outlets are provided in all the columns for attaching lamps for temporary use while setting dies. All light wires are run in conduits. Twenty-inch enameled lavatories are provided on each floor for the men, these being located in the open on one side of the room so that the workmen are not tempted to waste time as they might in a lavatory that is partitioned off. The sanitary arrangements include four closets and two urinals and a women's toilet room on each floor, the men's and women's rooms being separated by a brick soundproof partition.

The building and machinery are arranged for convenience in routing material through the various



Fig. 3—View on the Third Floor Showing 24 Automatic Nut Tapping Machines Made by the Acme Machinery Company. The Daily Capacity of These Machines Is Over 1,000,000 Nuts

The finished stock is kept on the fifth floor. The front section of the first floor and the corresponding part of the second floor is used for machine shop purposes and the remainder of the second floor is occupied by the toolroom.

In the bolt department in the adjoining building, the manufacturing processes begin at the ground floor and are carried on through the plant to the top floor where the bolts are heat treated and from where they are carried by gravity to the

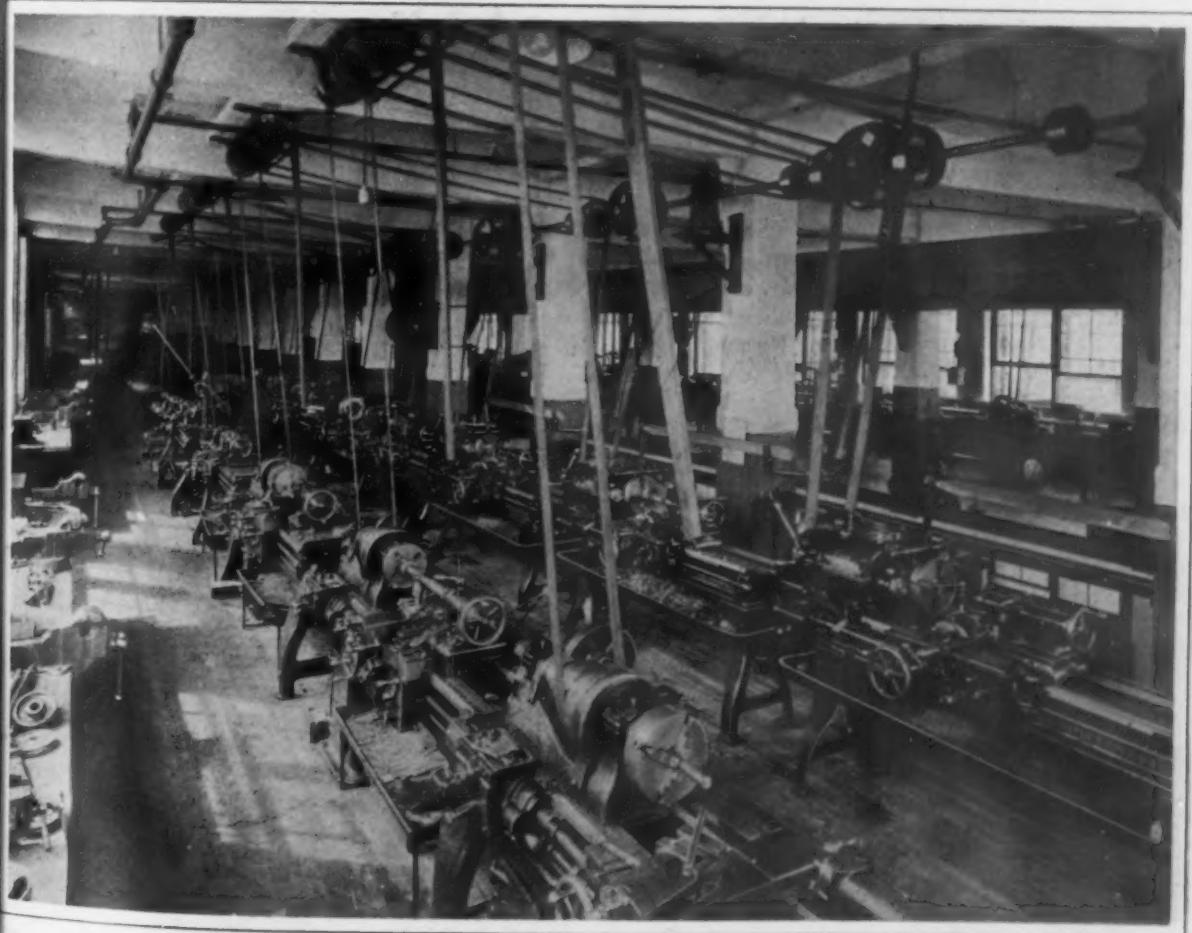


Fig. 5—View in the Machine Shop Showing in Row to Right Lodge & Shipley and American Lathes Equipped with Single Pulley Drives

manufacturing processes. The products include square, hexagon and fancy nuts, semi-finished, full finished and slotted. The hexagon stock is cut up on the first floor and goes to the fourth floor for the finishing operation. Fig. 1 shows a row of Waterbury Farrel Foundry & Machine Company's headers on the first floor. On the fourth floor cold punched nuts are reamed and tapped, semi-finished nuts are tapped and faced and castellated nuts are slotted. Fig. 2 shows two rows of specially designed drilling and tapping machines on this floor for hexagon nuts. The entire third floor is used for the square nut punching and tapping department. In Fig. 3 are shown 48 Acme Machinery Company's automatic machines arranged in two rows on this floor for tapping $\frac{1}{4}$ -in. square nuts.

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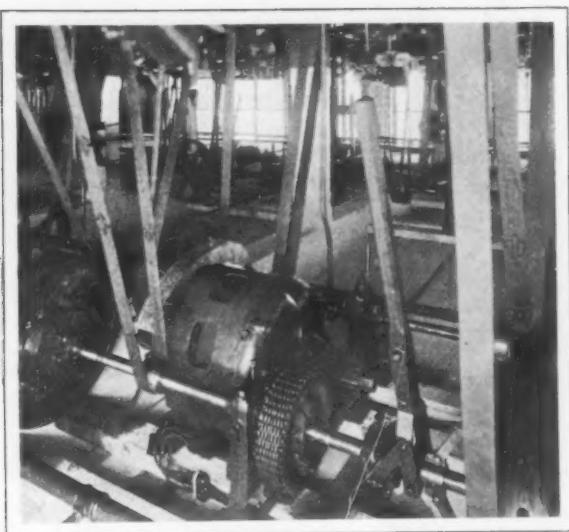


Fig. 6—Double End Motor and Chain Drive Used on the Fourth Floor

shipping and storage warehouse located between the two manufacturing buildings, where they are assorted and packed. Most of the nut products are finished on the same floor level as the storage warehouse room to which they are carted across the connecting bridge. With this routing arrangement the bolts and nuts manufactured in separate buildings, when finished conveniently reach a third building for assorting and packing.

An interesting feature of the plant is the machine shop on the first and second floors at the front end of the building. An opening in the first floor ceiling in the center bay at this end of the building provides a hatchway 50 ft. long and a 10-ton Brownhoist hand traveling crane is located on a runway just below the second floor ceiling, the hatchway and crane being shown in Fig. 4. This runway extends back 100 ft. or 50 ft. further than the hatchway and serves the machine shop sections on the first and second floors, covering the latter floor to a depth of 100 ft. The crane has a span of 15 ft. 6 in. The hatchway provides sufficient head room for handling heavy machine shop tools. A double door entrance is provided at the machine shop end of the building. The crane is used in handling parts in repairing and in erecting bolt and nut making machines, considerable of this machinery being of a special type and built by the company.

The machine shop arrangement together with the hand-operated crane is inexpensive and is regarded as very satisfactory for a comparatively small shop where the amount of work does not warrant a more elaborate machine shop lay out and a power-operated crane. In the machine shop all of the new machines are equipped with single pulley drives, the machines being belted direct to the lineshaft in order to do away with overhead belts and countershafts. It is the intention of the company eventually to replace a large part of the old machines with machines with single pulley drive. Fig. 5 shows one side of the machine shop on the second floor, the row of lathes on the right being single pulley machines driven directly from the lineshaft.

The driving shafts for the two parallel rows of hexagon drilling and tapping machines on the fourth floor are chain driven by two double end 30-hp. motors suspended from the ceiling between the two shafts that they drive, as shown in Fig. 6. The illustration shows one of the chain drives inclosed in a metal case. In other parts of the plant the drive is by a single end motor through a chain. In

the machine shop the lineshafts are chain driven from motors clamped to the adjoining building columns. In order to provide flexibility the machines throughout the plant are so arranged in groups that there is no less than 5 hp. or over 30 hp. in one group.

The lubricating system used in connection with the drilling and tapping machines has some interesting features original with this plant. The lubricating compound passes down from the machine into a vertical 2-in. pipe reaching the floor. The liquid is siphoned through a trap into a return pipe, which passes along the floor in a trench built in the concrete. Nine machines are connected to this pipe and two of these pipes are connected through a tee to a 6-in. pipe underneath the floor, which pipe runs along the ceiling with a slight pitch and is discharged into a tank from where the compound is pumped back to the machines by means of centrifugal pumps. By means of the trap arrangement fine chips that pass through the screens instead of being carried through the return pipe settle to the bottom of the pipe that extends to the floor under each machine and can be removed easily by opening a plug.

A special machine for forming winged nuts that is patented by the company is shown in Fig. 7. In making the winged nuts the blank is upset in the middle on an ordinary header at a speed of from 75 to 80 nuts per min., then the headed blank goes into the machine which forms it complete except flattening the wings and piercing the hole. This is done with three forming dies, fingers carrying the blank from one die to another. The first die flattens the ball, the second die forms the wings and the third bends the wings to the proper angle. This machine has a capacity of about 50 nuts per min.

Wire manufacturers of Bohemia are said to be back of the new steel plant and rolling mill under construction at Bruex, Bohemia, by a company with capital of \$300,000. The companies interested have been obliged to buy raw material from syndicated concerns, consuming about 1000 carloads per year, but expect now to produce enough for their own needs and for outside orders. Peter Eyermann, formerly of Dubois, Pa., is in charge of the construction work.

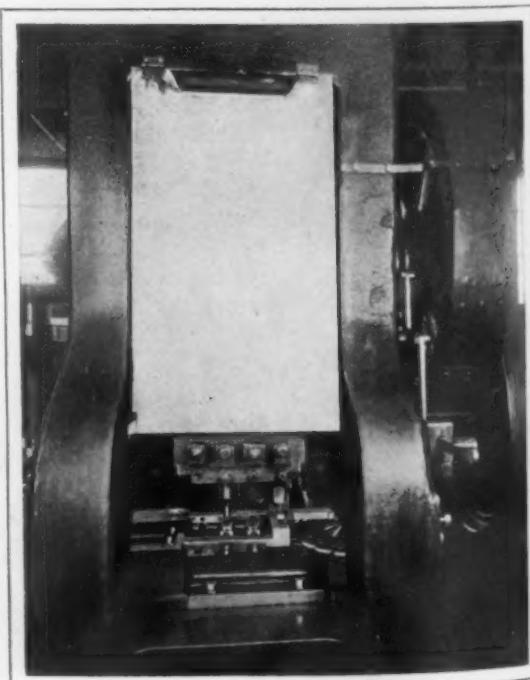


Fig. 7—Special Machine Used for Forming Winged Nuts

Overhead Coils with Temperature Regulation

Stevens-Duryea East Springfield Automobile Works Heated from Long Pipe Coils with Unique Regulation of the Steam Supply

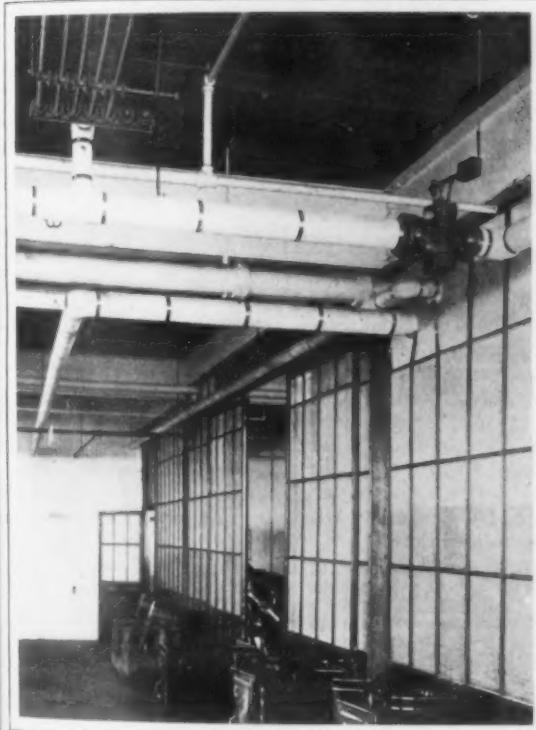
A unique method, which has proved eminently satisfactory, of heating a large automobile plant by the use of unusually large heating coils, each controlled from a central point, and without depending on a vacuum, has been put into effect in the new building of the Stevens-Duryea Company, East Springfield, Mass. The building was erected in 1912, from plans of F. W. Dean, Inc., Boston, and the building is heated by a Webster semi-modulation system installed by the Walworth Mfg. Company. The essential units in the control of the heating equipment were furnished by Warren Webster & Co., Camden, N. J.

The building, which measures 80 x 504 ft. and

weather of February, 1914, a pressure of 14 lb. was carried satisfactorily for part of the time. A higher pressure is used for heating the dry kilns and varnish rooms. Each boiler has a diameter of 66 in. with tubes 19 ft. long.

The factory is supplied with steam through a pressure reducing valve which permits a variation in pressure to meet weather conditions. In general, the radiating surface consists in overhead coils installed in large units as indicated on the accompanying plan. The system consists of an upfeed system of piping, with dry returns in the basement leading to a receiver vented to the roof. A pump, automatically operated by a float in the receiver, discharges the condensation to the boilers.

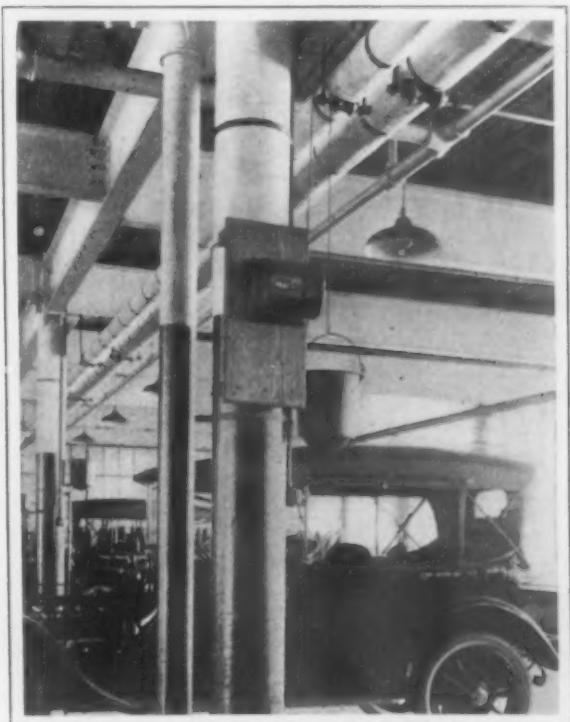
The essential feature of the system is the application of a Webster Sylphon trap at the return end of each coil. This trap serves to discharge automatically the water of condensation and air without the use of air valves. As the bellows in



The Steam Supply Valve to the Overhead Heating Coils, the End of One of Which Is Shown at the Upper Left, Is Opened and Closed by the Wire Extending to it from the Regitherm

is four stories high, is of the ordinary slow-burning mill construction, with brick walls, cast-iron columns, steel floor beams and plank floors. The heating problem was accentuated by a very large percentage of glass, equivalent approximately to 70 per cent. of the total wall surface. The windows are double glazed above the first floor, and steel sash is used, furnished by the Trussed Concrete Steel Company. All but the lower row of panes are of ribbed glass, with horizontal ribs. The basement is well lighted to a distance of 80 ft. back from these windows, which are only 6 ft. high on this floor.

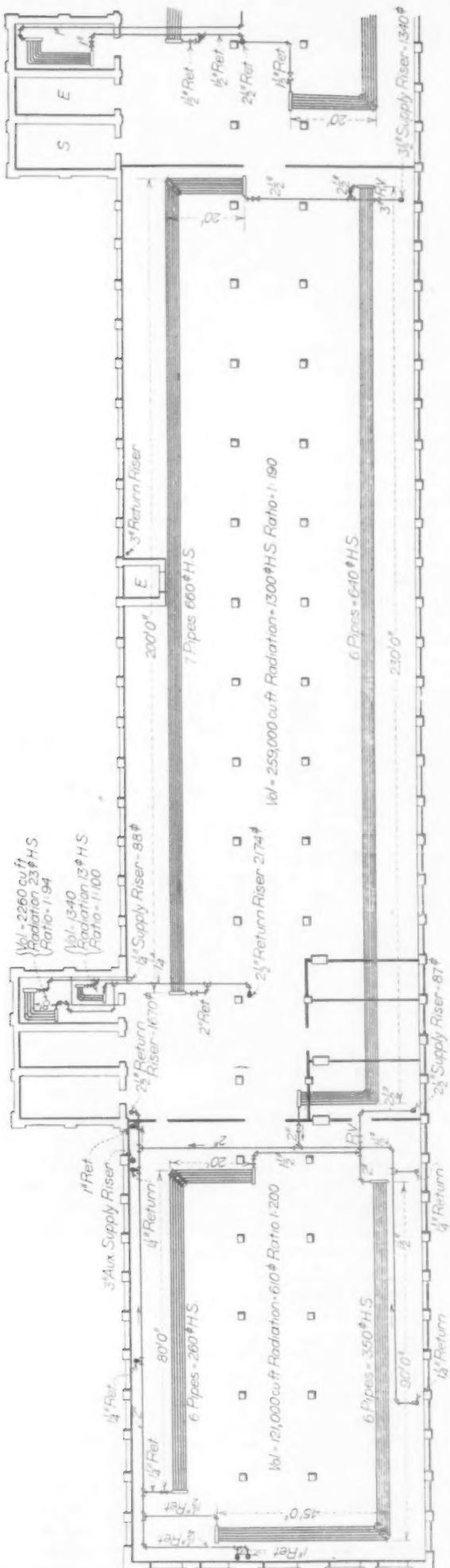
Power is electrical, from an outside source, except the steam taken from two horizontal tubular boilers for driving steam pumps. Ordinarily, 90-lb. boiler pressure is carried, reduced to 5 lb. or less for heating purposes. In the very coldest weather it is seldom necessary to increase this to more than 6 or 7 lb. per square inch. During the extreme



The Regitherms Are Mounted, for Example, on Building Columns. A Wire Rising from Each Is Carried to Balanced Steam Supply Valves to the Heating Coils

the trap expands when the coil fills with steam, the trap closes and the steam cannot escape. No vacuum is carried nor is it regarded necessary in this system. The piping is graded so that pockets are avoided and water of condensation and air flow through the dry return system to the vented receiver.

An interesting and economical feature in connection with the system is the application of Sylphon regitherms, shown in one of the photographic illustrations, placed here and there in the building, and controlling Mason balanced steam supply valves, shown in the second of the photographs reproduced,



Part of the Third Floor. Valves Marked RV Have Temperature Regulation

this valve admitting steam to the coils. This instrument does its work with precision under all sorts of varying weather changes, no matter how sudden. The graduated movement of the regitherm will open the balanced valve gradually—sometimes again closing it before it reaches a full opening. A slight change in the temperature of the room air expands or contracts a permanent volatile fluid contained within the all-brass Sylphon bellows of the regitherm. The inner pressure follows the action of the fluid, moving the head of the bellows out or in. This movement, multiplied by means of a lever, is transmitted by a small wire "cable" to the lever of the valve. Several coils in a room are controlled by a single regitherm.

As soon as the section of the building controlled by one of these regitherms reaches the desired temperature, the steam is shut off automatically and so remains until the temperature falls below the point at which the regitherm is set. Steam is then again admitted to a coil and the air quickly expelled through the wide open Sylphon trap, which again closes when the coil fills with steam. The hand control valve, at the supply end of coils not equipped with temperature control, is the only one which requires manipulation, for the Sylphon trap at the return end is automatic. The Sylphon traps have been found to work satisfactorily under a range of pressure from the atmosphere to 15 lb. per square inch. All the steam is condensed in the system, none of it escaping through the vent pipe, for the Sylphon trap acts to keep it out of the returns.

May Meeting of Iron and Steel Institute

The Iron and Steel Institute will hold its annual meeting in the new house of the Institution of Civil Engineers, Westminster, London, Thursday and Friday, May 7 and 8. On the first day the retiring president, Arthur Cooper, will induct into the chair the president-elect, Adolph E. Greiner. The Bessemer gold medal for 1914 will be presented to Edward Riley, and the Andrew Carnegie gold medal for 1913 will be presented to Thomas Swinden. The papers announced are the following:

J. O. Arnald and G. R. Bolsover, "The Forms in which Sulfides may Exist in Steel Ingots."

C. Benedicks, "Experiments on Allotropy of Iron (behavior of ferro-magnetic mixtures; dilatation of pure iron)."

A. Bose, "Recent Developments of the Iron and Steel Industry in India."

C. Chappell, "The Recrystallization of Deformed Iron."

C. A. Edwards and H. C. H. Carpenter, "The Hardening of Metals, with Special Reference to Iron and its Alloys."

J. N. Friend and C. W. Marshall, "Influence of Molybdenum upon the Corrodibility of Steel."

H. C. Greenwood, "Note on a Curious Case of Decarburization During the Hardening of Steel Dies."

Sir Robert A. Hadfield and B. Hopkinson, "The Magnetic and Mechanical Properties of Manganese Steels."

H. L. Heathcote, "Some Improvements in Case-hardening Practice."

S. A. Houghton, "Failures of Heavy Boiler Shell Plates."

E. Humbert and A. Hethey, "Production of Steel Direct from the Ore."

A. McCance, "Theory of Hardening."

M. Mission, "The Colorimetric Estimation of Sulphur in Pig Iron and Steels by Means of Paper Impregnated with a Solution of Arsenious Anhydride in Hydrochloric Acid."

F. Müller, "The Development of Dry Cleaning in Blast-Furnace Gas Purification."

W. Rosenhain and J. L. Haughton, "A New Reagent for Etching Mild Steel."

F. Schuster, "Results of Talbot Process at Witkowitz."

The autumn meeting of the Institute, on invitation of the Comité des Forges, will be held in Paris, September 18 to 23.

The secretary of the Iron and Steel Institute, George C. Lloyd, will furnish information to any interested in the sixth international congress of Mining, Metallurgy, Engineering and Economic Geology, to be held in London, July 12 to 17, 1915. Arthur Cooper is chairman of the executive committee and Sir Hugh Bell treasurer.

CORROSION OF METALS

Less Between Steel and Bronze than Between Steel or Iron Alone

In a paper on the "Corrosion of Metals and Alloys in Contact" in the Engineering Record for January 24, 1914, Richard H. Gaines, chemist, Board of Water Supply, New York City, gives the following experimental and practical results:

During the past two years experiments have been in progress at the laboratory of the New York Board of Water Supply to determine the loss suffered from corrosion by steel and other metals when in contact under different conditions, and incidentally to observe some of the phenomena of galvanic action.

Corrosion in Concrete.—In the first series of experiments specimens of the metals listed in table 1 were weighed and embedded singly and in contact in damp concrete and allowed to remain therein for two months. At the end of the test period the concrete blocks were broken up and the metals taken out, carefully cleaned, dried and re-weighed, the loss in weight representing the amount of corrosive action in each specimen.

TABLE 1—CORROSION IN CONCRETE

Metals	Single Metals		Loss in grams, per sq. ft.
	Jan. 2, 1912	Mar. 4, 1912	
Manganese bronze	73.6655	73.6475	0.0180 0.32
Steel	39.1556	39.1481	0.0075 0.135
Lead	92.3806	91.7146	0.6660 11.99
Copper	73.7630	73.7272	0.0358 0.64
Monel metal	62.9667	62.9646	0.0021 0.04
Metals in Contact			
1—{ Steel	37.0380	37.0270	0.0110 0.20
Manganese bronze	70.6864	70.6700	0.0164 0.30
2—{ Steel	38.1746	38.1700	0.0046 0.08
Lead	90.0399	89.5408	0.4991 9.08
3—{ Steel	38.8055	38.8031	0.0014 0.03
Copper	70.1913	70.1348	0.0565 1.04
4—{ Steel	38.6396	38.6271	0.0125 0.23
Monel metal	60.1092	60.1074	0.0018 0.30
5—{ Steel	34.5625	34.4626	0.0999 2.48
Lead	83.8596	83.5163	0.3433 6.77
Copper	68.9752	68.9626	0.0126 0.31
6—{ Steel	34.7072	34.8026	0.0676 1.68
Fiber	64.1247	64.1122	0.0125 0.31

The resulting losses show but slight differences when in contact and alone, and, therefore, give no positive evidence of electrolytic action when the metals are coupled in concrete. With the exception of the lead the corrosion loss of all the metals was negligible, that of the Monel metal almost nil.

The corrosive action in the case of lead is purely solvent in character, due to the alkali, and no surface coating is formed to hinder progressive deterioration. The metal specimens all presented about the same appearance when taken out of the concrete as when put in.

Corrosion in Water.—After the first series of tests was completed the same specimens, singly and in contact, were placed in Mason fruit jars freshly filled with Croton water. The jars were then sealed and put on a shelf in the laboratory, where they remained about 19 months. At the end of this period the specimens were taken out of the jars and carefully cleaned, dried and re-weighed. The losses due to corrosive action are given in table 2.

In each of the foregoing series of experiments (i.e., in damp concrete and in Croton water) specimens numbered 1, 2, 3 and 4 were in absolute metallic contact, flatly bolted together by iron machine screws and nuts. Specimen 5 consisted of three metals flatly bolted together, but the connecting bolts were insulated from the plates by fiber collars and washers. Specimen 6 was made up of two metals separated absolutely from galvanic contact

by a fiber plate but held together by bolts which were also insulated from the plates by fiber collars and washers.

DEDUCTIONS FROM RESULTS

The evidence from these experiments apparently indicates, however, that contact between steel and

TABLE 2—CORROSION IN WATER

Single Metals		Loss or gain, grains, per sq. ft.
Mar. 4, 1912	Oct. 3, 1913	19 mo.
Manganese bronze	73.6475	73.6971 +0.0496
Steel	39.1481	36.9767 -2.1714 39.08
Lead	91.7146	91.7591 +0.0445
Copper	73.7272	73.7254 -0.0018 0.032
Monel metal	62.9646	62.9554 -0.0092 0.17
Metals in Contact		
1—{ Steel	37.0270	35.7425 -1.2845 23.12
Manganese bronze	70.6700	70.6822 +0.0122
2—{ Steel	38.1700	36.9922 -1.1778 21.20
Lead	89.5408	89.3314 -0.2094 3.77
3—{ Steel	38.8031	37.6435 -1.1596 20.87
Copper	70.1348	70.1522 +0.0174
4—{ Steel	38.6271	37.7372 -0.8899 16.02
Monel metal	60.1074	60.1108 +0.0034
5—{ Steel	34.4626	33.2073 -1.2553 22.59
Lead	83.5163	83.4896 -0.0267 0.48
Copper	68.9626	68.9684 +0.0058
6—{ Steel	34.8026	34.4543 -0.3483 6.27
Fiber	64.1122	64.1047 -0.0075 0.14

bronze, and steel and the other metals of the series, neither promotes nor accelerates the corrosion that normally takes place in steel alone. By its very lack of homogeneity in composition and structure the average steel surface in water as it occurs in nature presents all the conditions necessary for active electro-chemical corrosion.

What the writer once termed auto-electrolysis is the inevitable outcome, and this process in steel does not appear to be hastened by contact with other metals or alloys. In fact, the legitimate conclusion from the foregoing experiments is that rather less than more galvanic action arises from contact between steel and the other metals of the series than from contact between steel and steel. In actual practice it has been found that if a steel nut is put on a steel bolt and subjected to corrosive conditions, in a comparatively short time the steel nut will have to be hammered or split off, if gotten off at all, on account of rusting together from local corrosive action; whereas a brass or bronze nut on a steel bolt under similar condition can be readily screwed off. This is a very important consideration where quick changes in water works machinery or installation must of necessity be made from time to time.

RESULTS OF PRACTICAL EXPERIENCE

H. J. Force, of Scranton, Pa., engineer of tests of the Delaware, Lackawanna & Western Railroad, stated that throughout their experience in dealing with mine waters cast iron in contact with bronze lasted longer and withstood corrosive action better than cast iron in contact with cast iron.

According to the English authority, J. Newman ("Corrosion of Metallic Structures," page 185), experience has shown that where brass bolts have been used to fasten the planking or wooden sheathing of ships to the steel or iron plates of the vessel, no deterioration has resulted, whereas iron bolts in the same situation have soon become corroded.

Thomas J. Gannon, mechanical engineer and inspector in charge of the outside work of the Department of Water Supply, Gas and Electricity of New York City, said that he had seen steel rods that were sleeved with bronze and apparently no galvanic action occurred even in salt water, and that on gland bolts on high-pressure valves the department has used bronze nuts on steel or wrought-iron bolts with no indication of any deterioration in four or five years.

Recent Data on Electric Steel Castings

Practical Results at Two Foundries Using Different Furnaces—Cost Data and Discussions at the American Electrochemical Society's Meeting

Electric furnace steel, with special reference to steel castings, was an important feature of the Thursday afternoon session, April 16, of the twenty-fifth general meeting of the American Electrochemical Society, held at the Chemists' Building, New York, April 16 to 18. Two papers were presented, one by C. A. Hansen, of the research laboratory of the General Electric Company, Schenectady, N. Y., entitled "Electric Steel Castings," and the other by E. B. Clark, president Buchanan

Electric Steel Company, Buchanan, Mich., on "Electric Furnaces for Steel Making." It is somewhat unusual for this society to have a session devoted so largely to steel, but the electric steel furnace, involving as it does an electrochemical process, is ample explanation for this. Both papers, especially the latter, present some valuable practical data based on actual operations in producing electric steel castings and large portions of each paper follow:

Electric Furnace Steel Castings

BY C. A. HANSEN

During the summer of 1911 a 3-phase arc furnace, having a nominal capacity of two tons per charge, was installed in the new and modern foundry of the Treadwell Engineering Company, Easton, Pa. The cost of melted metal from this furnace has been found to be somewhat less than one-half that of the old crucible furnace plant when the latter was using oil at $2\frac{1}{2}$ c. per gal. Since the advance in the price of oil has added \$6 to \$7 more to the cost per ton of molten crucible steel, the possibilities of saving in costs are readily apparent. So far as the product is concerned, the most striking differences are not found in comparing electric and crucible steels of similar compositions. If any differences exist between such steels, they are negligible in importance, as repeated tests have shown.

Electric steel castings are usually made in lower carbons than it is possible to make from even clay-lined crucibles. In the latter it is perfectly possible to melt 0.20 carbon steel, but it is not possible to run the 0.20 carbon product regularly into light-section castings. As a result, 0.30 to 0.40 carbon castings are the usual output of the crucible steel foundry, and all castings which require machining must be annealed. With the electric furnace, furnace maintenance costs increase rapidly as the carbon content of the product is brought down, and, quite contrary to current opinion, it is not economical to turn out 0.10 carbon steel castings, although it is perfectly possible to do so. It is, however, economically practicable to turn out 0.20 carbon castings, and such castings can be machined easily without annealing. There is little question that all castings, whether 0.20 carbon or 0.30 carbon, can be improved by annealing, but the American attitude seems to be against the expense of annealing where annealing can be avoided.

VARIATIONS IN METAL CHARGES

Current opinion also has it that the advantages of the electric furnace follow largely from the fact that such a furnace can work up any sort of a charge. While this may often be true, it is not well to base estimates of the cost of molten electric furnace steel upon the usual published furnacing costs and upon the local prices of stove-scrap and similar materials. Probably every operator of an electric steel furnace has at one time or another run off heats from charges composed of stove-scrap

or its equivalent, and little need be said of the reasons for or against such a procedure.

Many have suggested charging molten cupola metal directly into the electric furnace for refining. In several such cases of which I know, the power consumption per ton of output was greater for the cupola metal charge than for the cold scrap charge; the original cost of the cupola metal was in the neighborhood of \$18 per ton, as compared with \$12 per ton for the regular cold charge, and the cost of furnacing was likewise higher for the cupola metal charge. The economy incident to heating the furnace with auxiliary fuel-burning apparatus may interest those who charge molten metal into electric furnaces, but the interest attaches rather to the prevention of skinned furnace bottoms than to a direct saving in electric energy. Heating the furnace and charge to a good red heat by means of oil burners (with oil at $2\frac{1}{2}$ c. per gal.) increased the cost \$1 per ton over the regular practice of all-electric heating. Keeping the furnace hot over night by means of either oil or electric energy was found not to materially decrease maintenance costs, and it did increase the cost of production. These items above refer to power supply at approximately 1c. per kw.-hr.

ADVANTAGE OF CONTINUOUS OPERATION

Much stress has been laid on the economy attaching to continuous operation of the electric furnace as compared with mere day-shift operation. So far as costs go for the molten steel, it is true that continuous operation means 10 to 15 per cent. saving over intermittent operation. Very little has, however, been said regarding the relative efficiencies of day and night work in the other departments of the foundry, nor has it been well impressed upon the mind of the average investigator of electric steel problems that one can easily lose many times the 10 to 15 per cent. saving in molten metal costs in the decreased efficiency of the night shifts on the molding floor, cleaning room, etc.

Claims are being made that 10 to 12 heats from cold scrap can be taken from one electric furnace in 24 hours. Possibly they can, but the furnace will have to be rebuilt at least three times each week.

These and other considerations have led to the practice, now established at Easton, of operating the foundry on day shift only, charging a good quality of steel scrap, enough pig and ore being

added to keep the charge off the furnace bottom, and casting steel of around 0.20 carbon, unless otherwise specified. The furnace plant has been operated on a one-heat-per-day basis, requiring 7 to 7½ hr. to turn out its charge from the cold furnace. Power consumption at furnace transformer primary terminals has, in that case, averaged 1050 kw.-hr. per 2000 lb. (909 kg.) steel in the ladle.

The furnace has been operated also on a two-heat-per-day and three-heat-per-day basis, when business conditions warranted. The second and third heats, having the advantage of being started off in a hot furnace, are finished in 4½ hr., at a current consumption of 630 to 640 kw.-hr. per ton. Even with the three heats per day, no steel is poured outside of the regular day shift. Two men start the furnace shortly after midnight, and steel is poured at 7.15 a. m., 11.45 a. m. and at 4.30 p. m. The uncertainties attaching to pouring on schedule time are not as great as they are with either open-hearth or crucible furnaces.

Much has been written, especially by electrochemists familiar with direct-current electrolytic apparatus, regarding the undesirable character of the loads taken by arc furnaces. It may therefore be well to state that the load curve for the furnace here considered is smoother and of higher power-factor than the load of similar magnitude used in the shops of the Treadwell company where the products of the steel and iron foundries are machined. It seems a pity that the electric steel furnace was not developed by people familiar with the load characteristics of modern machine tools,

rolling mills, street railways, etc. Central stations are quite familiar with these loads, but they are not familiar with the arc furnace, so when we dwell upon the bad features of the arc-furnace load we can scarcely blame the central station for supposing the load-curve of the latter to be a really bad one.

Since the above was written, Mr. Treadwell has sent me the following additional data concerning his furnace:

Average number of heats per week.....	15
Average weight per heat, pounds.....	4,600
Average power consumption per 2000 lb., kw.hr.....	900
Average repair costs per 2000 lb.....	\$2.50
Average electrode costs per 2000 lb.....	\$2.50
Average weight castings made, pounds.....	9
Ratio of cleaned castings, risers, etc., to charged weight, per cent.....	92.95
Ratio of finished castings to charged weight, approximate per cent.....	60
The furnace lining is repaired after 35 heats.	

Mr. Treadwell is a firm believer in pouring extremely hot steels, and this fact is reflected in the high maintenance costs and in a rather high power-consumption. A similar furnace, of which I have accurate records, shows costs as follows:

Power consumption per 2000 lb., kw.hr.....	725
Repair costs per 2000 lb.....	\$1.30
Electrode costs per 2000 lb.....	\$2.15

The latter furnace is pouring somewhat colder metal into castings of 15 lb. average weight, and repairs to the furnace lining are made after 8 to 10 weeks' operation on the same basis of 15 heats per week. In the latter case the repair charges include upkeep of the bottom-pour ladles used, and I believe this is also the case with Mr. Treadwell's figure.

Electric Furnaces for Steel Making

BY E. B. CLARK

The intending user of an electric furnace wishes dependable answers to two questions:

1. How will an electric furnace compare with some other apparatus for producing or refining steel as to quality of output and cost of operation?

2. Assuming the wisdom of an electric furnace installation, what is the best type of furnace, and what size of unit is proper?

Most of the available literature upon these subjects is of a theoretical nature. Information from a practical standpoint will generally be acceptable, but when one is actually a user of electric furnaces in the commercial production of steel he does not find a great deal to say. After all, this is not a surprising fact, for the electric furnace does not offer anything radically new in the production or refining of steel. Its use is generally contemplated for a purpose where steel may be made or refined either in an electric furnace, a crucible furnace, a Bessemer converter, or an open-hearth furnace.

The crucible furnace enables one to make accurate alloy mixtures of high quality without contamination from gases or furnace linings. Practically no refining can be done and therefore high grade materials must be used for the mixture. By the law of supply and demand, the price of pure materials for use in crucible furnaces will be higher where the crucible process is employed to a considerable extent. The electric furnace will produce steel of the same degree of purity as a crucible furnace, and the possibility of refining in an electric furnace makes possible the use of less pure materials. This is an advantage for the electric furnace and, at the same time, an advantage for the crucible furnace, because the demand for the high grade materials necessary in the crucible process is

reduced by each additional electric furnace installation and therefore the price of the charge for the crucible furnace is reduced. This is especially true as applied to the small crucible furnaces used in foundry practice, which require low-phosphorus steel punchings for their successful operation.

The small Bessemer converter, or Tropenas vessel, is capable of producing hot steel in small units quickly. It does not permit of refining, however, and therefore, necessitates the use of low phosphorus and low sulphur pig iron which must be pre-melted in a cupola, using high grade coke. The losses are severe and the steel is not free from oxides and occluded gases. The electric furnace will produce steel just as hot as the small Bessemer vessel, but free from oxides and occluded gases. However, the electric furnace requires scrap for charging rather than pig iron, so if only pig iron is available at commercially desirable figures, the pig must be converted into steel before charging into the electric furnace.

The open-hearth furnace will produce from pig and scrap, steel of a fairly high degree of purity and of fairly high temperature. The electric furnace will do the same thing (except that the use of a large percentage of pig is not desirable) and is capable of producing purer and hotter steel than is the open-hearth under usual operating conditions.

THREE PROCESSES COMPARED

Summarizing these general observations, it may be said that for the alloying of steels the electric furnace offers nothing that the crucible furnace does not; for the production of very hot steel the electric furnace offers nothing that the Bessemer converter does not; and metallurgically speaking,

the electric furnace offers nothing that the open-hearth does not. It is a fact, however, and this is the important fact, that the electric furnace combines in itself certain advantages of all three of the other processes mentioned. On the other hand, it is seldom that one wishes to secure the advantages of all these other three processes combined in one. Generally, a certain object is in view by the intending user of an electric furnace or some other form of apparatus for producing steel. Of course, broad generalities will not solve this problem. The cost of production is the final answer from a commercial standpoint, and this depends not only upon the market for the intended output, but upon the available supply of steel making materials, and upon the availability of a satisfactory and sufficiently cheap source of electric power. In passing it might be observed that this question of electric power supply is generally not so serious as might at first appear. In the first place, there are many locations where a sufficient amount of fairly cheap electric power may be purchased; and in the second place, the item of power is not often of supreme importance.

There are other elements entering into the production of electrically refined steel which have a far greater influence on the cost of production than is generally credited. The most important of these is experience. It should be understood clearly that the electric furnace is a more delicate apparatus than any of the other three furnaces mentioned. It is more difficult to handle and its operation offers more likelihood of mishaps. Electric furnace operation has not yet been reduced to standard practice. Melters familiar with its operation are scarce and difficult to find.

THE BEST TYPE OF FURNACE

To attempt an answer as to what type of furnace is best is as unsatisfactory as to make general comparisons between electric furnaces and other furnaces. If we could accept at face value the statements of a number of men interested in the development of certain electric furnaces, we could easily believe that as soon as a foundryman had installed an electric furnace (provided he installed the right one) his troubles would be at an end. As a matter of fact, he is apt to find that they are just beginning. In the first place, unless the design of the furnace has been thoroughly tried out in practice, it will certainly have to be modified considerably from the designer's ideas. In the second place, the user will certainly find the furnace to be a more delicate piece of apparatus than he had anticipated. He will find that while he can make steel of a very high quality, he can also make, without difficulty, much steel of a very low quality. If there are in the Society some men who have been using electric furnaces for the production of castings or special steels, they will have no difficulty in recognizing these remarks as coming from one who has had such experience.

It so happens that the speaker's experience has embraced not only a study in this country and Europe of the design and operation of a number of different types of furnaces, but has embraced the actual operation of two typical types of furnaces for the production of steel castings. The investigation as to which general type of furnace is best led in my case, as in that of most others, to much confusion of ideas. It is so evident that each type has certain advantages and disadvantages, and so impossible accurately to gauge the proper importance of the various advantages and disadvantages, that one cannot reach a conclusion

as to which type of furnace is best with confidence in his conclusion. Perhaps the only way to learn is to try them all. As a matter of fact, the speaker has already tried two, and feels that he has not yet decided the question.

THE STASSANO FURNACE

We have operated two furnaces of 1 to $1\frac{1}{2}$ tons capacity each, of the surface-arc type. This general type is best exemplified by the Stassano furnace, the general construction of which is well known. Our furnaces use three-phase power and the arcs are maintained above the surface of the bath. They are lined with magnesite brick, which, of course, while a high refractory, is quite susceptible to damage by sudden heat changes. Very hot and very good steel has been produced in these furnaces. The cost of repairs has been rather high, due to necessity for relining rather frequently. We have found that linings last, under proper treatment, about 40 to 50 heats, though we feel that some changes in methods of construction would increase the number of heats per lining and, therefore, decrease this item of cost very considerably.

The labor cost on operating these furnaces has been found to be rather high, but this is principally due to the small capacity of the furnace. The power costs have not been high when the furnace has been operated continuously, even despite the small capacity of the charge. Where commercial conditions have made it necessary to permit considerable time to intervene between heats, the power consumption has been increased, due to the necessity of keeping the furnace fairly hot between heats. Experience in operation, however, has made it possible to reduce this item of expense far below what was originally believed possible. Even where the furnace is operated on day turn only and kept hot over night with current, the power consumption was surprisingly low for so small a furnace. Electrode costs have been quite reasonable.

Summing up, it may be stated that the operation of these furnaces has been quite satisfactory, as regards quality of output, reliability of operation and cost of production, when the size of the furnace is taken into consideration. Two furnaces should be used alternately, so that ample time can be allowed for relining, without interfering with the continuous supply of hot metal.

THE HEROULT FURNACE

The increasing demand for hot metal for foundry purposes led us to consider the installation of additional metal-producing capacity. We consider that the type of furnace which has just been described is not suitable for units above from 2 to $2\frac{1}{2}$ tons capacity, because of the increasing difficulty which probably would be experienced with linings in the larger sizes. As a furnace of approximately five tons capacity was necessary, we decided to install one of the submerged-arc type, represented by such furnaces as the Heroult and Girod. A Heroult furnace was put in and has been operated very satisfactorily. Power consumption has been less than in the smaller furnaces, but only by an amount which would be expected for the difference in the size of the furnaces.

As a matter of fact, claims for low power consumption by any furnace should be received skeptically. It is a fact that the power consumption of any electric furnace depends somewhat upon the efficiency of the furnace, but it also depends to a

far greater extent upon the method of operating the furnace. The furnace efficiency depends upon the thoroughness of the heat insulation, for, after all, the only heat which is lost is that which escapes by radiation or conduction. That which goes out in the slag, or in the steel, depends not upon the efficiency of the furnace, but upon its mode of operation. Where a high degree of refining is necessary, slags must be taken off, at the cost of power consumption. Where the furnace must be operated with considerable time between the heats, heat is escaping rapidly during that idle time.

Where heats must be held in a furnace, or melted slowly, to meet a definite schedule, a high power consumption must be expected. For these reasons it appears that the claims for low power consumption of certain furnaces are practically valueless from an operating standpoint. The conditions of operation, rather than the type of furnace, are what control the power consumption, though, of course, the construction of the furnace, as regards heat insulation, does have some influence.

In our 5-ton Heroult furnace, we have found the cost of repairs to be lower than in the smaller furnaces. This is due to a considerable extent to the type of furnace, but our experience in the operation of electric furnaces has also helped in this respect. Furthermore, we have not yet reached our hoped-for results as to repairs. The labor costs are less on the larger furnace, as might be expected, partly because it is automatically controlled, and largely because of its increased output.

Discussion of the Two Papers

A spirited and lively discussion followed the presentation by C. A. Hansen of these two papers by title, who stated that experience thus far has enabled producers of electric steel castings to not only easily surpass crucible steel costs, but also to reduce their own costs by 50 per cent.

Henry D. Hibbard, consulting engineer, Plainfield, N. J., opened the discussion by the statement that the two papers were valuable in that they gave results from actual practice, but he felt that operators had not yet learned the economical limits of temperatures and that often the temperature of electric steel was too high economically.

Ernest P. Humbert, Electro-Metals Company, New York City, took decided exception to the last paragraph of Mr. Clark's paper. He felt that it was a reflection on sellers of electric furnaces that was uncalled for. So far as the Heroult furnace was concerned, he stated that there was plenty of data available as to its value and productive capacity. While good steel castings could be made in crucibles, low carbon ones could not. He firmly believed that electric furnace steel fully equals the best crucible. As to Mr. Clark's statement regarding the delicacy of an electric furnace and the difficulty of obtaining good melters, he was of the opinion that while any electric furnace was more delicate than other kinds, he had been able to find and train men to operate such a furnace easily and reliably in a short time, and he regarded it as an accepted fact that it took years to make a good open-hearth melter. The scarcity of electric melters, he said, was due to lack of furnaces. He felt that the difference in power consumption between the two furnaces in Mr. Clark's experience was due to their relative size. In his opinion the Heroult furnace had an advantage over the Stassano in that its electrodes were

RELATIVE MERITS OF THE TWO TYPES

To summarize our views upon the relative merits of the two types of furnaces, as based upon our own experience, I would say that we have found the surface-arc type to be a much better furnace than its critics would have one believe. On the other hand, we have found the submerged-arc type better for our purposes because of its larger capacity and lower cost of operation. It would not be fair, however, to ascribe the lower costs entirely to its type, for the capacity of a unit certainly has much to do with the lower cost. Where a foundry is, like ours, entirely dependent for its supply of hot metal upon the electric furnace, this type is better by reason of less necessity for lining repairs.

No attempt has been made here to give actual figures of operation. This is not due entirely to reluctance to publish our costs of production. As a matter of fact, the costs of production are so much dependent upon local conditions, such as quality of scrap available, continuity of operation and price of electric power, that results obtained in one installation, if used as a basis for other installations, may be most misleading. The predominating influences in this case are the commercial conditions surrounding each separate installation.

In conclusion, I wish to reiterate my statement that an intending user of an electric furnace may expect to learn much more about the furnace by his experience after he gets it than by the statements of some one who wishes to sell him a furnace.

vertical affording less radiation to the roof, while the horizontal electrodes of the Stassano were continually wearing the roof away by excessive radiated heat.

Dr. Karl G. Frank, Siemens & Halske Company, New York City, called attention to the progress in Germany, where 101,000 tons of electric steel had been made in 1913, as compared with 75,000 tons in 1912, a large majority of which had gone into steel castings. In Austria-Hungary 30 to 40 per cent of the electric steel is made in induction furnaces with very satisfactory results.

Henry Hess, Philadelphia, Pa., remarked that he had been operating a Stassano furnace at Bridgeton, N. J., for some months, producing steel castings and that no trouble had been experienced with the roof, which was of magnesite. He felt that Mr. Humbert's claim regarding the Heroult furnace in this respect was a mistake.

Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa. stated that all electric furnace roofs are not silica, as had been intimated, but that magnesite and aluminum nitride were being considered. European progress he attributed to the greater patience exercised there.

Carl G. Schluederberg, Pittsburgh, Pa., called attention to observations he had made on a recent visit to the new plant of the Latrobe Steel Castings Company, Latrobe, Pa., where a 6-ton Heroult furnace is in operation. He saw a manganese steel heat successfully poured and stated that the load curve was excellent, often maintaining a nearly straight line after the first half hour. The power factor was almost unity.

C. A. Hansen called attention to the regular compositions that could be maintained from an electric furnace, while in his opinion converter and crucible steel castings were the results of

guess work resulting in very non-uniform metal. He also stated that with one heat a day it cost \$80 a ton to make a $\frac{1}{2}$ -ton heat, and \$21 per ton to make a 15-ton heat, whereas with two heats per day the cost for a $\frac{1}{2}$ -ton heat was \$60 per ton and \$19 per ton for a 15-ton heat, and A. H. Cowles, Electric Smelting & Aluminum Company, Se Warren, N. J., maintained that the larger the furnace the greater the efficiency.

Edwin F. Cone, *The Iron Age*, New York, said that the superiority of electric furnace steel castings, chemically and physically, had not been sufficiently emphasized; that steel from the electric furnace, because of superior refining conditions, was not only purer chemically, especially as regards sulphur, but that castings poured from it have a higher static value for the same composition than those made commercially by any other process. Not only was this true as regards tensile strength, but their elastic ratio was decidedly higher, equaling in many cases that of acid open-hearth castings with vanadium, other conditions being equal. It was also true, he claimed, that

dynamically electric furnace steel castings surpassed any other kind, other conditions being the same. Many tests confirmed these contentions, among which were those published in *The Iron Age* of May 29, 1913, made on steel from the Treadwell Engineering Company's furnace.

These remarks precipitated considerable difference of opinion, Mr. Hess maintaining that it made no difference whether the steel was made in a crucible or an electric furnace as to physical properties. Mr. Hansen claimed that electric steel had no superior physical properties, as comparative tests between it and open-hearth steel at Schenectady had shown. Prof. Richards expressed the opinion that there was no doubt about the superiority of electric steel castings because of the refining action, which was impossible in any other process, and the contention was supported by Mr. Hibbard. Mr. Cone felt it necessary to add that it was a self-evident fact that the purer a steel, the better its properties, and that the superior purity of electric furnace steel was unquestionable.

Economic and Aesthetic Aspects of Electrochemistry

Preceding the afternoon session reported in the foregoing and just after a morning session devoted to a symposium on power problems in electrochemistry, a complimentary luncheon was tendered the 300 members and guests attending. In the evening of the same day a highly enjoyable and unique smoker, also complimentary on the part of the New York section, was participated in by a large number. Motion pictures, songs and delectables of various kinds served to render the evening one not soon forgotten. It was opened by a scholarly address by Dr. E. F. Roeber, the retiring president of the society, this adding conspicuously to the permanent value of the convention as a whole. The address was entitled, "Some Economic and Aesthetic Aspects of Electrochemistry." The leading question considered was: How does electrochemistry bring about a recasting of economic and aesthetic values? After an introduction on formal beauty in theoretical and industrial electrochemistry the speaker expressed the opinion that the effect of modern science and engineering on aesthetics was to emphasize the necessity of a return to the aesthetic viewpoint of classic Greece, as embodied in Socrates' view of the kinship of beauty and utility. For this reason, before speaking of the aesthetic aspects of electrochemistry, he dealt with its economic aspects.

This discussion was based on the well-known classification of Knies of economic values into place value, time value, and form value. The products of electrochemical industries have always high form value, and a long series of these products has also place value and time value due to the fact that they have a very high energy content. By transporting electrochemical products to some other place where their energy content may be needed, they get place value. By getting the energy content out of them when it is needed they get time value. This is the foundation of "chemical power transmission." It differs from electric power transmission in two essentials. It is not bound to fixed route, it needs no line wires, as electrochemical products can be transported anywhere by the ordinary transportation facilities, like railways, ships, etc. And it is not bound in its utilization to a fixed time, as it can be stored. Calcium carbide has form value because acetylene can be produced from it; it has

place value, because the carbide can be transported to any place where the acetylene may be needed; it has time value, because the carbide can be stored and the acetylene can be produced at the moment when it is needed.

There is a long list of electrochemical products which may be considered from the viewpoint of chemical power transmission. In bleaching powder we transmit the possibility of producing a bleaching or disinfecting liquor whenever and wherever it is needed. In the series of peroxides we transmit their avidity to give off an atom of oxygen. In thermit we transport the capability of producing at any place and any time superheated molten steel for repairing, welding, etc. The Norwegian calcium nitrate industry is an example of international chemical power transmission, and so on.

The electrochemical industries affect modern civilization in its most various phases. What was waste before, what was nuisance, becomes valuable; and in chemical power transmission electrochemistry has brought into modern civilization an absolutely new element by which what is now waste power is being scattered all over the world, to build up industries, to further agriculture with fertilizers, to light cities with acetylene, to aid public health with bleaching powder and to affect civilization in general in its most heterogeneous aspects.

That electrochemists as true creators are bringing about a revaluation of economic values, there can be no doubt. But what has electrochemistry to do with aesthetics?

If beauty is perceived through our senses, the first question is: How has modern engineering affected our senses? And the answer is that modern engineering has extended our natural senses by giving us artificial senses in the form of instruments and apparatus.

"If we hear our little children of three or four years talk to us over the long-distance telephone in such a self-evident, matter-of-fact way as though they were sitting on our knees, we cannot escape the conclusion that a new generation is rising that looks at the world with new eyes, with new senses. But what has electrochemistry to offer to this new generation in aesthetic ideals?"

"It seems to me that the fundamental contribution which electrochemistry has to make to aesthetics

is to carry to its last consequence the principle that waste can never be beautiful. Of course, this old principle is as old as art. But the growing multiplicity of our sensual knowledge due to the magnified and projected extension of our senses forces us to use waste where our ancestors saw beauty and had a right to see beauty."

The speaker then concentrated his remarks on the one subject that is uppermost in this connection in the minds of American electrochemists—the question of the power development of Niagara Falls. The beauty of Niagara Falls, like all beauty, is subjective in the onlooker. The question is simply: What do we see when we stand at the brink of Niagara Falls?

"Our ancestors who knew nothing of the principle of conservation of energy, of transformation of different forms of energy into each other, looked simply at the material side of the Falls and saw beauty and had a right to see beauty. And if we force ourselves into such a one-sided attitude of mind we can still see beauty.

"But if we stand as modern men at the Falls with a free attitude of mind, we don't see simply water; we see power. We see the possibilities of using this power for electric power transmission for lighting, traction and industrial purposes on a wider area. We see the even greater possibility of storing this power in electrochemical products and utilizing them all over the land in all walks of life. If we look at the Falls with this attitude of mind, which is the natural one for modern men, every cubic foot of water that goes thundering over the Falls unutilized appeals to us as waste and nothing but waste.

"But there is little use in using argument in aesthetic matters. All we can do is to make people see for themselves, to use their own senses, all of them, their natural ones and their artificial ones. Engineering developments teach people to do this every day and we can rest assured that as sure as day follows night, a new generation is rising that will use its senses, all of them, and make its own aesthetics and enforce them."

The new officers for the ensuing year are: President, F. Austin Lidbury; vice-presidents, Carl Hering, W. D. Bancroft, William Brady; managers, H. C. Parmelee, W. R. Whitney, C. G. Frick; treasurer, P. G. Salom; secretary, Joseph W. Richards. The next general meeting will be held at Niagara Falls next October.

British Iron and Steel Exports

Great Britain's iron and steel exports for the first three months of 1914 show an increase in tonnage and a decrease in value as compared with 1913. The total sent abroad to April 1, 1914, excluding iron ore and scrap, was 1,206,435 gross tons, against 1,176,691 tons in the first three months of 1913, the increase being 29,744 tons. The decrease in values was £255,051, or from £13,321,611 to £13,066,560. Pig iron, including ferroalloys, shows a decrease in exports of 21,559 tons, the total to April 1, 1914, being 234,378 tons against 255,937 tons. The exports of galvanized sheets were 31,952 gross tons greater to April 1, 1914, than for the first three months of 1913, or 213,870 tons against 181,918 tons. Rails account for the rest of the increase of 51,000 tons in finished material. In bars, ship and boiler plates, black plates and hoop and strips the foreign demand has been less.

Imports of iron and steel, excluding iron ore and scrap, to April 1, 1914, were 577,490 gross tons against 583,158 tons to April 1, 1913, a decrease of 5688 tons. The values for these two periods were £3,859,204 and £3,967,789, respectively, a decrease in imports of £108,585 as compared with last year.

National Foreign Trade Convention

The steel industry is prominently represented in the general committee that has been appointed to arrange for a national foreign trade convention at the Hotel Raleigh, Washington, D. C., Wednesday and Thursday, May 27 and 28. The convention is under the auspices of the American Manufacturers' Export Association, the American Asiatic Association, the Pan-American Society of the United States and other important commercial organizations. A number of chambers of commerce, boards of trade and manufacturers' associations have signified their approval of the purpose of the meeting and will participate in it by sending delegates. The general committee is composed of the following:

Lloyd C. Griscom, chairman; James A. Farrell, Chas. E. Jennings, Chas. A. Schieren, Jr., Williard Straight, Eugene P. Thomas, Ellison A. Smyth, Alba B. Johnson, Henry White, Charles M. Muchnie, Frederic Brown, Edward V. Douglass, John Foord.

The purpose of the convention is to give expression to the views of men representing the productive activities of the country with regard to the more effective promotion of American commerce in the markets of the world. In the call for the convention, E. V. Douglass, 66 Broadway, New York, secretary of the general committee, says:

"The success of this convention must largely depend upon the presence of representative manufacturers, merchants and others from every section of the country, comprising all branches of industry. The papers to be presented will be prepared by men identified with the conduct of practical affairs, and will be issued in advance, so as to be in the hands of delegates before the sessions at which they will be discussed. In this way a full and free expression of sentiment from the collective membership of the convention will be made possible, and such an interchange of views as may tend to greater unity of effort will be facilitated."

French Iron and Steel Production in 1913

Returns just published show that the total pig-iron production in France was 5,311,316 metric tons in 1913 as compared with 4,939,314 tons in 1912, a gain of 372,002 tons. The production of steel ingots, classified according to processes, was as follows:

	1912 Tons	1913 Tons
Acid-Bessemer ingots	124,663	122,514
Basic-Bessemer ingots	2,812,780	2,934,312
Open-hearth ingots	1,452,462	1,539,558
Crucible and electric-furnace ingots	38,314	38,782
Total	4,428,219	4,635,166

The decrease in acid-Bessemer steel was offset by increases in other directions, the net gain being 206,947 tons. The Comité des Forges de France gives the steel ingot production of its members as 4,419,241 tons in 1913 as compared with 4,078,353 tons in 1912. Finished steel produced by the Comité des Forges in 1913 amounted to 2,993,050 tons as compared with 3,028,799 tons in 1912, a decrease of 35,749 tons.

Some interesting features illustrating the growth of the Bristol Company, Waterbury, Conn., maker of Bristol's recording instruments, are pointed out in connection with the fact that this year is the 25th anniversary of the founding of the company. The records show that the floor space it has occupied has doubled at the rate of once every five years during the last 20 years. The space originally used when the business was begun in 1889 was 144 sq. ft., or a room 12 x 12 ft. in size. Five years later, in 1894, the company occupied 7500 sq. ft. By 1909 the floor space had doubled three times, as in that year 61,880 sq. ft. was occupied. The actual floor space used this year is 123,386 sq. ft., showing that the space facilities of the company more than doubled in the last five years.

Suggestions on Operating Power Trucks

Forms for Keeping Cost and the Use Which Should Be Made of the Records of the Commercial Vehicle

BY H. C. SPILLMAN

The utility of the commercial truck in the world of transportation is far beyond the experimental stage and is fast taking the place of the horse-drawn truck and other slower methods of transportation. Its wonderful progress has placed it in a separate class. The vital question is to minimize the maintenance expense and make the trucks operate at their maximum efficiency. Rapid depreciation, large repair bills, inconvenience and losses sustained during the time that the truck is laid up for repairs are matters which should receive careful and serious consideration.

Getting the maximum efficiency out of gasoline trucks can only be accomplished by giving the subject a very careful study and watching the performance of each truck almost continuously. There is no better method of avoiding heavy trucking expense than by keeping careful records and making a daily and monthly comparison. A railroad official would be lost without accurate records and comparative figures covering a long period of time. This information is all based upon a unit basis, such as ton mileage or number of tons carried per mile, total tonnage, fixed charges, operating expense and similar items which show him at a glance the exact cause of increased cost of transportation and allow him to pick out the weak points in his organization. A great deal can be learned from a railroad report in handling motor trucks as this is a transportation problem pure and simple. A number of manufacturing firms are changing over from horse-drawn equipment to the motor trucks and it is well to remember that this change is going to revolutionize their trucking problems.

ROUTINE CHANGES NECESSITATED BY MOTOR TRUCKS

Organization, loading and routing trucks, inspection, repairs and reports are some of the items

which need to be altered to suit the new conditions. When a firm is in its busy season it is customary to work the horses very hard, which causes them to loose flesh and during a slack season they are turned out and allowed to regain their lost strength and in a few weeks they are in excellent condition and ready for another hard grind. Unfortunately this cannot be followed when operating motor trucks. If a power truck is overloaded parts of its mechanical equipment are strained beyond their working limit and the truck will continue to give trouble until these parts are replaced. Quite often some parts of the trucks are in need of repairs and if allowed to run they will cause other parts to weaken which will run up the price of maintenance.

For this reason it is advisable to form a rigid rule that each truck is to be carefully inspected each morning before leaving the garage to see that it is supplied with the proper amount of gasoline, water and oil, and in case some part is in need of repairs it is to be taken care of immediately. If this rule is carried out the efficiency of the trucks is greatly increased, and can easily make the heavy grades and operate at its maximum governed speed. It is an excellent policy to place a good foreman in charge of the garage who should have full jurisdiction over this department. His duties should include entire charge of the drivers and repairmen, routing of trucks, loading of trucks, inspection of trucks, repairing of trucks, repairing of tires and report cards.

C. M. M. Co.

Driver's Daily Truck Report

Date _____

Name of Truck _____ No. _____

Gallons of Gasoline _____

Pints Motor Oil _____

Pints Gear Oil _____

Pints Anti-Freeze _____

Miles Run _____

Tonnage Carried Out _____

Tonnage Carried In _____

No. Miles Running Light _____

Actual Running Time _____

No. Trips _____

No. Stops _____

Remarks _____

Driver's Signature _____

Daily Report Filled Out by Each Driver

196

Daily Record for Month of

191



A Motor Truck Equipped with a Special Cushioned Wheel

each day showing what each man is doing to obtain a correct distribution of the labor. All requisitions for parts and tires should be approved before purchasing and charged directly to the truck upon which they are used. General supplies, such as soap, metal polish, etc., should be prorated to the different trucks which will give a fair average and reduce the office labor. The daily report, which is entered in a bound book, gives a permanent record of the daily operation of each individual truck. This record is of great value as it enables the owner to make a comparison on his transportation costs.

SECURING COST OF OPERATION DATA

The accompanying table shows the summary of all of these reports which give all the data at a glance and also allows a comparison from the previous month. The question of fixed charges always brings forth considerable discussion and this is more or less a matter of personal opinion. Five or 6 per cent. is a good allowance for interest on investment and it is customary to allow a straight depreciation of 15 to 20 per cent. License and insurance are items which vary in different localities.

In case the repairs for a certain month run into a large figure they should be distributed over a number of months in order to keep the unit prices as near constant as possible. Some companies allow 2½ to 3 cents per mile for repairing and overhauling of trucks, which is a fair average. With this same end in view it is best to take the cost of a complete set of tires and obtain the tire cost per mile by basing the complete mileage on the life of the tires in the tire maker's guarantee. The unit cost of 3.4 cents per mile for tires is based upon a set of solid tires costing \$272, and guaranteed for 8000 miles. From this data, including the daily records, fixed charges and operating expense, it is an easy matter to obtain the cost per ton mile, cost per ton to deliver and cost per mile to run.

The cost per ton mile is to be obtained by taking the total tonnage and dividing by double the number of trips which gives the average load. This result is multiplied by the total mileage which

gives the ton miles. This is a valuable figure and much stress is laid upon this item in railroad transportation. It shows that it is a double advantage

Monthly Report of the Gramm Truck

	January	February
Actual number of working days.....	26	23
Tonnage (in)	42	39
Tonnage (out)	56	70
Total tonnage	98	109
Number of loads.....	65	76
Number of stops.....	152	117
Number of round trips.....	56	49
Mileage loaded	1,280	980
Mileage light	110	196
Total mileage	1,390	1,176
Total ton miles.....	1,216	1,308
Net running time, hr.....	142	120
Motor oil consumed, pt.....	42	36
Gasoline consumed, gal.....	310	247

Averages

Average daily mileage.....	53,400	51,10
Average miles per hr.....	9.800	9.80
Average tonnage per load.....	1.500	1.43
Average tonnage delivered per day.....	3.770	4.74
Average number of loads per day.....	2.500	3.30
Average miles per gal. gasoline.....	4.500	4.70
Average gasoline consumed per mile, gal.....	0.223	0.21

Fixed Charges

Interest on investment for month.....	\$24.80	\$24.30
Depreciation for one month.....	79.60	79.60
License and tax one month.....	1.50	1.50
Insurance one month.....	2.65	2.65

Total fixed charges for month..... \$108.05 \$108.05

Operating Expense

Tires (1390 miles @ 3.4 cents per mile).....	\$47.26	
Tires (1176 miles @ 3.4 cents per mile).....	43.40	\$39.98
310 gal. gasoline @ 14 cents per gal.....	.....	34.58
247 gal. gasoline @ 14 cents per gal.....	.....
Cylinder oil	2.20	1.90

Labor:

Driver's wages	78.00	69.00
Repairs	4.12	3.95
General work pro rata.....	5.20	4.70

Total operating expense for month..... \$180.18 \$154.11

Total expense for month..... \$288.23 \$262.16

Average Costs

Fixed charges per working day.....	\$4.160	\$4.690
Operating expense per working day.....	6.930	6.700
Cost per ton mile.....	0.237	0.200
Cost per ton to deliver.....	2.920	2.400
Cost per mile to run.....	0.207	0.223

to have the truck travel both going and coming with a load, as it increases the ton miles and reduces the cost of this item.

In order to increase the efficiency and life of a truck all the parts should be well lubricated and

the truck washed at least once each week. A new feature for trucks is cushion wheels, which double the life of the tires, save the engine and other parts, minimize the maintenance expense and increase the life of a truck. The cushion is made of rubber inserted in a special made wheel and is located between the tire and the hub. Another new introduction is a governor on the motor which allows a maximum speed of 12 miles per hour.

Every manufacturer appreciates the value of reducing the cost of production and the same efficiency and economy can be applied to the matter of transportation charges. By keeping a close watch in this department the unit costs will be greatly reduced and the trucks will be more efficient.

EARLY HISTORY OF T-RAILS*

A Concise Statement of the Development of Rail Sections

The first rolled rails used in railroad construction and operation were of a rectangular cross-section, and were supported on longitudinal wooden stringers. These rails under increased loading and speed gave trouble by turning up at the ends and were finally abandoned before 1850.

In 1830 Robert Stevens designed the first T rail in America for the Camden & Amboy Railroad. In England a new section of rail, known as the pear-shaped rail, was developed, which had a cross-section similar to the later T rail, but with heavier web and larger fillets. This rail was imported and used to some extent in this country. These rails were rolled of iron and gave fairly good service under light loads, but when the driving wheel loads reached 10,000 to 12,000 lb., and the speed of trains attained 25 to 30 miles per hour, the rails commenced to break or split up in the head, and gave considerable trouble.

The first Bessemer steel rails were rolled in England about 1860, and about 1863 a number of trial lots were imported and used in this country. These rails were from 56 to 58 lb. in weight per yd., 4 in. in height, and with comparatively thick base and thin head. In this connection, about 1864, the Erie Railroad Company ordered from Sheffield, England, 1000 tons of Bessemer steel rails, at about \$120 per ton.

FIRST BESSEMER RAILS MADE IN AMERICA

The first Bessemer steel rails made in America were rolled at the North Chicago Rolling Mill in May, 1865. Three rails were rolled on May 24, and three more on May 25 of that year. They were rolled from steel ingots produced at the Wyandotte mills, near Detroit. These rails were laid in the track of the Chicago & Northwestern Railway and carried traffic for over ten years, but, unfortunately, there is no record of the time when they were taken out and discarded. The first sections of rails rolled in this country were 4 to 4½ in. in height, and had a comparatively heavy base and thin head. In order to get more wear out of the rails, the head was made thicker and the base thinner, but this produced a coarse, granular structure of the steel in the head and did not give as good wear as rails with a thinner head.

It will probably be interesting to those of us located in this section to learn that in September,

1867, steel rails were rolled at Spuyten Duyvil, N. Y., by the Spuyten Duyvil Rolling Mill Company, from ingots made at the Bessemer Steel Works, at Troy, N. Y. These, however, were only experimental.

The first action by an organized body of engineers in regard to the character and quality of the rails used on the railroads in this country was taken by the American Society of Civil Engineers in 1874, when a committee was appointed to investigate and report on the form, weight, manufacture and life of rails. This committee made a progress report in June, 1874, and again in May, 1875, and a final report in June, 1876. At that time the steel rails were comparatively few, and had not been in track a sufficient length of time to warrant the committee in drawing a conclusion regarding them. Hence, the report of this committee dealt almost exclusively with iron rails and only incidentally referred to steel rails.

The records indicate that the use of steel rails was first resorted to on account of the poor quality of iron rails manufactured during the early seventies and subsequently, as the quality of the iron was steadily deteriorating. The wear of the iron rails took the form of cracking and lamination, or flaking, which destroyed the running surface of the rail and rendered it unfit for use, as the faggots from which the iron rail was rolled were little more than bundles of rods, while the steel rail on the contrary was rolled from a solid ingot, and for that reason was much more durable.

Experience would indicate that the best iron, if homogeneous and the head of uniform hardness, would, with machinery of moderate weight, wear a third or even one-half as long as steel, but under heavy machinery it would not wear so well when the top crust became worn through, on account of the iron mashing in spots before wearing out.

THE A. S. C. E. RAIL SECTIONS

In 1887 the American Society of Civil Engineers again appointed a committee to consider the principal relation to each other of the sections of rails and wheels. This committee made a progress report in 1888 and a final report in 1889. In the following year, 1890, another committee was appointed by the same society to prepare and submit to the society a series of standard sections for rails of different weights per yard. This committee made a preliminary report in 1891 and a final report in 1893. This latter report was accompanied by designs for a series of sections of rails weighing from 40 to 100 lb. per yd., varying by intervals of 5 lb. These sections were approved by the society, and are known as the A. S. C. E. standard sections. They met with favor and were adopted by many of the railroads. In a few years probably about two-thirds of all the output of the rail mills was in rails of the A. S. C. E. sections, their distinctive feature being that, no matter what the weight per yard, the height of the rail and width of base are identical.

This report of the American Society of Civil Engineers committee was a most valuable step in standardization, for prior to its report there were almost 300 different rail sections in use by the different railroads, which involved an unnecessarily large investment in rolls by manufacturers.

The question of the American Society of Civil Engineers committee was to devise a section which it considered suitable and which could be easily rolled; but at the time of the report no rails heavier than 80 lb. were in general use, consequently the A. S. C. E. 85, 90, 95 and 100 lb. sections were devised along purely theoretical lines, the distribution

*From a paper delivered before the Railroad Men's Improvement Society, New York, January 22, by Charles C. Cluff, manager of sales, Carnegie Steel Company, Illinois Steel Company, and Tennessee Coal, Iron & Railroad Company, New York.

of the metal in all sections being uniform, i.e., in the head, 42 per cent.; web, 21 per cent.; flange, 37 per cent.; which, in the case of the heavier sections, made the flange comparatively thin and therefore liable to cool faster than the head, which coupled with their higher carbon content made their manufacture very difficult for the mill.

THE AMERICAN RAILWAY ASSOCIATION SECTIONS

Realizing the importance of this question a committee was appointed by the American Railway Association to investigate and make recommendations on standard rails and wheel sections, and in its report of March 23, 1908, it recommended two types known as the A. R. A. "A" and the A. R. A. "B" sections. The designs submitted by this committee cover sections of 60, 70, 80, 90 and 100 lb. per yd. The principal difference between the A. S. C. E. sections and the A. R. A. sections is that the latter have a narrower and heavier base and lighter head than the former, and are therefore better able to resist breaking under eccentric bearing on the ties.

The A type was designed to meet the requirements of those who advocate a rail with thin head and great transverse strength, and B type to meet the requirements of those who believe there should be a narrow deep head with transverse strength a secondary consideration.

Type A has a shallow head, wide base and thinner flange, and a greater height of section than type B, and is generally used on stretches of tangent track on the prairie roads of the West where more of the load is taken care of by the rail and less required of the ties and ballast.

Type B, with its deeper head, is more generally used where the pounding of the heavy traffic would tend to crush the head, its shallower section thus requiring more from the ties and ballast. Type B seems to be preferred by the roads in the East, particularly the coal roads, on account of their heavy traffic and great curvature. These two types of the American Railway Association sections are the ones in most general use to-day.

In conclusion, your attention is called to the fact that, owing to the tendency of the railroads toward a continual increase in the weight of cars and locomotives, with their greater wheel loads and higher speed, the trend must naturally be toward the use of standard rails of larger cross-sections and heavier weights, say weighing up to 125 or 130 lb. per yd., as the meeting of the requirements for this service by the aid of chemistry has practically reached its limit.

T. A. Willson & Co., Inc., Reading, Pa., manufacturer of eye protectors and goggles, through its president, Frederick Willson, has purchased a half block of property to permit of the enlargement of its plant as necessity may require. About four years ago the company more than doubled the size and capacity of its plant by the erection of a new building and this year it made a small addition. The acquisition of land just consummated expresses Mr. Willson's confidence in the future growth of his company's business. The company has in operation a system of profit sharing in which the heads of departments, some 25 in all, are included. It publishes a paper entitled *Between Friends* for distribution among its employees, and gives attention to welfare work, athletic teams and similar activities tending to help the employees and bind their interest with that of the management.

A new engine has been added to the equipment of Sarah furnace of the Kelly Nail & Iron Company at Ironton, Ohio. Three new boilers have also been installed recently at this furnace.

Money Needlessly Spent for Oil

BY N. G. NEAR

Every man who has studied engineering has doubtless studied the characteristics of oil to some extent and knows a little about flash point, viscosity, gravity and some of the properties of minor importance, the three mentioned usually being considered the most important. How many ever make use of their knowledge of oil? Yet it is right in connection with oil that important savings are possible, because it is human to dislike to test an oil. Rather is the salesman's word taken.

The only equipment needed for making the three most important tests is usually to be found in any manufacturing plant; a thermometer for the flashing test, a pair of scales for the gravity test, and a tin can with a hole in its bottom for the viscosity test. This apparatus, as here listed, may be regarded crude, but it is certainly better than nothing and will be found to give surprisingly accurate results—results that will at least be comparable.

An acquaintance recently went into a large plant where considerable oil is used and was surprised at the high price being paid for oil. The oil looked just like the oil he had been using, which was sold at one-fourth the cost of the oil used in this large plant. So he decided to give the two oils a thorough try-out side by side, both by means of physical tests and actual usage in a machine that could be cut out at any time without interfering with the operation of the plant.

He found very little difference in their physical characteristics, just as he had expected, and when applied to the machine he found the lower priced oil actually to give the better results. His method with the machine was to run it at normal speed with one of the lubricants and quickly throw a switch at a certain instant, by his watch. He then took the time required for the machine to come to a standstill at no load. Then he tried the other lubricant under full and no load, just as he had done with the first, and after a time which he judged to be sufficient he took the stopping time with the second oil. Then he retried the first. Then he retried the second. And so on. Finally he decided, as stated, that the less expensive oil was the better, and he convinced the manager that he was right. The expensive oil is no longer used in that plant.

Thousands of dollars are lost in this way in many a plant simply because the men who buy the oil believe they are getting the best that can be got by paying the highest price. Make a comparative test on a machine that is not of great importance and see if costs cannot be cut.

The Shuman Advertising Company has succeeded the Shuman-Booth Company, which was dissolved April 13, R. R. Shuman buying the interest of Carl H. Booth in the partnership. Mr. Booth retires to become vice-president of the Metallurgic Engineering Company, Chicago, patentee and builder of electrical melting furnaces. Mr. Shuman has organized a stock company with \$20,000 capital to continue the business, with headquarters at 620 Westminster Building, Chicago, the old address. The organization will remain intact and the new company expects to take a still larger part in trade and technical journal advertising, as well as carrying on a general advertising agency.

The exports of machine tools from Germany rose from 72,000 metric tons in 1912 to 87,000 tons in 1913. Total exports of machinery other than electrical were 594,000 tons in 1913, an increase of 55,000 tons over 1912.

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Our Relations with Mexico

After a long period of unsatisfactory relations with the de facto government of Mexico, this country is virtually at war with Provisional-President Huerta. President Wilson and his advisers have been exceedingly anxious to avert a contingency of this kind and have been perhaps too patient while indignities and persecutions have been inflicted upon American citizens whose business has compelled them to reside in Mexico. Their patience has finally been tried beyond endurance, and the fighting machinery of the United States Government has been put in motion to compel our truculent southern neighbor to treat our interests with more respect and greater consideration.

It is to be hoped that the display of force now being made will be sufficient, without much bloodshed, to accomplish the purpose intended. If, however, actual warfare cannot be averted, the Administration will have the full support of the country in what it may do to bring about a better condition of affairs in Mexico. The situation is grave and may mean the sacrifice of many valuable lives and the expenditure of a vast amount of money if it should become necessary to invade and occupy any considerable portion of Mexican territory.

Of one thing the Mexican people can be assured, and that is that no war of conquest or for extension of territory is contemplated. Our experience with Cuba is a lesson to the world that we can engage in war for the purpose of bringing about better conditions in a neighboring country and can relinquish territory which might be of value to us. The United States is large enough to satisfy our people, and we do not need another square mile of earth.

While war is terrible, and every effort should be made to avert it, yet a war with Mexico, if it should come, would undoubtedly bring with it some benefit to general business. It would be impossible for this Government to expend large sums of money for war purposes without greatly stimulating many branches of trade. This was our experience in 1898 when we engaged in the war with Spain. If millions should be poured out within the next few weeks the effect would be widespread. It would perhaps extend beyond our borders and have some influence on the trade of the world. Possibly a development of this kind would lift us out of the slough in which business has been floundering for some considerable time and start us again on the road to prosperity. If, also, it would have a bene-

ficial effect on Congress, in causing less attention to be given to legislation interfering with business interests the sacrifices entailed upon us by a state of war would not all be in vain. Perhaps some such fearful price must be paid before the minds of our statesmen will be lifted to the consideration of higher subjects of patriotism and the promotion of the whole country's welfare.

Increasing Tonnage of Steel Scrap

The outcome of steel scrap is increasing very rapidly. As to old material, there is no reason to suppose that the average period of employment is increasing; rather the tendency is toward shortening the period, since things move more rapidly these days, and there is more willingness to scrap old machinery, buildings and other structures if comparisons show that they have outlived their usefulness. Until recent years, at any rate, the production of wrought material doubled once a decade, on an average, and if the period of employment remained the same the outcome of old material would likewise double every ten years. If the average period of employment shortens, the outcome must increase still more rapidly year by year.

Another influence tending to increase the outcome of scrap is the fact that the density of distribution is increased. The number of tons of material in use per square mile has been steadily increasing, whereby it becomes less and less difficult to collect the old material which arises. The pieces to be gathered are not so far from each other.

The production of new scrap, resulting from the fabrication or working of the steel mill's output to fit it for actual use, is naturally increasing in close consonance with the increase in the production of steel ingots. As manufacturing operations are more systematized year by year, and as they grow larger, the collection and sorting of such new scrap become easier, and a smaller proportion of mixed scrap comes upon the market, the material produced by different manufacturing processes being more rigidly segregated.

Dealers in scrap have been more or less alive to their increased opportunities, and have been improving their yard facilities whereby they can do more now than formerly toward putting old material into the best form for consumption by their customers. It is probable that a great deal more can be done in this direction by installing special machinery for cutting or compressing the forms of

material which are found to be growing more common.

An interesting development in the direction of adapting scrap to use is found in the increasing use of the hydraulic compressor for handling the sides and ends sheared from the packs in sheet and tin mills. A few years ago such apparatus, at least in its present effective form, was almost unknown, while to-day it may be estimated that more than half the mills producing such scrap have installed hydraulic compressors. One enterprising mill, having its own steel plant, has installed sufficient capacity to compress not only its own production but also a considerable tonnage purchased in the market in the familiar bundled form.

The total tonnage of side and end sheet and tin mill scrap is greater than is generally appreciated. The production of sheets, 13 gauge and thinner, and black plates for tinning, was 2,839,880 gross tons in 1912, the last year for which statistics are available. It is commonly figured that the loss from the sheet bar to the finished material is about 12 per cent. of the weight of the latter, which would indicate that the production of this scrap was between 300,000 and 350,000 tons in that year. As is well known, the output of sheets and black plates is growing very rapidly, more rapidly than the average output of all finished steel, so that it will probably not be long until there will be produced by this industry half a million tons a year of solidly compacted steel, in blocks of very convenient size for the basic open-hearth steel furnace. It is interesting to note that this material is to-day selling at about \$3 a ton less than basic pig iron, delivered to steel mills in the Pittsburgh district.

Steel Sheets to Resist Weather

From time to time manufacturers of steel sheets have made desultory efforts to correct the evil involved in the use of sheets lighter than the proper gauge for resisting weather, but nothing tangible has been accomplished, and it is now the opinion of many leading manufacturers that the industry is being injured, or at least retarded in its growth, by the use of this light material.

While the general tendency of the day in the construction of buildings of various types is to make them more durable, the tendency in the employment of steel in the form of roofing, siding, eave trough, conductor pipe, etc., is admittedly in the direction of using lighter and lighter material. Consideration of the matter cannot be dismissed on the ground that it is simply the consumer's business, let him do what he likes, because unsatisfactory experience with steel has a tendency to promote the use of other materials. When light gauge roofing and siding are used with unsatisfactory results, the inclination is likely to be not to employ heavier gauge sheets but to abandon steel and use some other material.

The market offers many such other materials. They are, as a rule, those which require the backing of the manufacturer, and the manufacturer accordingly is obligated by the circumstances to see that the material will actually perform the service desired, usually indeed giving a definite guarantee for a period of years. With sheets it is not so. The performance is everybody's business and therefore

nobody's business. Consumers use lighter and lighter material, and if results are not satisfactory they condemn the material as a class.

If these tendencies continue, popular opinion will gradually be shaped to the pronouncement that for temporary structures painted black or galvanized steel is permissible, desirable on account of its cheapness, but for permanent use some other material should be employed. The conclusion ought to be, at least in many cases, that for permanent use a heavy enough gauge should be used. It is commonly reported that a great deal of corrugated roofing and siding is now being used which is actually 31 gauge galvanized, whereas such material is hardly adapted even for temporary use. It is being employed by many who do not realize now, though they soon will, that it is totally unfit for the purposes intended. Ordinarily a much heavier gauge should be employed. The United States Steel Corporation, which is not likely to waste even the materials it makes itself, has a standard for all its mill buildings, 22 gauge galvanized for siding and 20 gauge galvanized for roofs. The steel sheet involved in 20 gauge galvanized is precisely three times as thick as the steel sheet used in making 31 gauge galvanized. The cost per square foot of the heavier material, however, is only double that of the lighter material. The durability is unquestionably many times as great. The heavier material may last as many years as the lighter does months.

While no statistics have been kept, indicating the tonnage of steel sheets, black or galvanized, which find their way to weather-resisting use, there is good reason for believing that the amount is increasing slowly, if at all, whereas the use of sheets for other purposes is increasing very rapidly. The demand for sheets for outdoor work would undoubtedly grow much more rapidly if those who use them in this way would be wise enough and fair enough to call for the proper gauges.

Cutting Wages to Keep Busy

A Knoxville, Tenn., manufacturer, writing to *The Iron Age* concerning the possibility recently referred to of wage reductions in plants of independent steel manufacturers, says:

If competition with foreign countries on steel is too keen, this is the only possible solution of our problem. Some people believe low wages mean lack of prosperity. The leaders of the labor unions preach this gospel. As I see it, the contrary is true. Low wages mean that this country can produce in competition with foreign markets and thus sell abroad and keep our domestic mills going full time and pile up a balance of trade to our credit in foreign markets. Low wages mean industry instead of idleness.

Naturally, the prices of all commodities correspond exactly to the wage scale. The only cost in a cook stove or a plow, except the royalty on the iron ore and coal in the ground, is the wages paid from the time the ore was taken out of the ground until finally delivered to the consumer in the shape of a finished stove. If the wages of all individuals making this stove and making the pig iron and coke were reduced 10 per cent., the stove itself would naturally cost 10 per cent. less when finished, and therefore each man getting 10 per cent. less wages can buy 10 per cent. more cook stoves with a dollar than before and more of everything else in the world that is produced by cheaper labor.

With the low universal wage scale our factories stay busy because we can then keep out foreign goods

and also do business abroad. Therefore we benefit rather than suffer from a low wage scale. The high cost of living is certainly nothing more than the low amount of production.

While we agree in part with the thought developed by our correspondent, we dissent from his proposal to cut wages as a means of making plants busy. Plants are made busy by a demand for their product, and decreasing the purchasing power of the wage earners of the country is not the way to add to demand. There is no question, however, of the need now pressing upon manufacturers in every line to reduce the cost of their product. Wherever reductions in wages are advocated, it is not that the manufacturer considers a thinner pay envelope to be a means to the betterment of his own condition. What he aims at is lower unit cost of output. This could be secured by maintaining wages if at the same time production per man were sufficiently increased.

Our correspondent says in another part of his letter: "Let us cut our wages until our factories can keep busy. Let us cut selling prices of commodities to correspond (which would be done instantly). Let us stamp out the idea that men must produce as little as possible for a day's work and fight every machine or method that makes for greater production." We agree entirely with this last; but the difficulties of getting an instant reduction in prices corresponding to reductions in wages are more than the writer of the above seems to appreciate. Such adjustments do not come through national conventions representing all lines of manufacture, at which it is agreed to reduce wages and then to cut prices of products. All sorts of irregularities occur in times of depression. Some lines are still busy, while others are in the slough of despond. Some wage cuts are quickly accepted; others are fought in strikes lasting for months.

Lower wages may or may not be the answer to depressed conditions. But one answer that must come is that of larger production, resulting in lower unit cost of labor. It may come in the weeding out of the less efficient workmen and at the same time in the greater output per dollar of pay, which is made by the workmen who remain and work hard to hold their jobs. It may come in ways which the brain of the owner or manager devises, making it possible for men and machines to do a larger day's work.

Prosperity has the same effect on proprietors and men. The former, being crowded with orders at good prices, are mainly interested in getting the orders filled, and production costs rise with little resistance. Under high wages and a full shop, many workmen grow careless, their output declines and fat pay envelopes suggest holidays and the spending of money easily earned. The tendency of hard times is to force both owner and workmen to cut down the cost of production. Good wages should be as gladly paid then as at any other time if in return there is extra exertion to reduce the unit cost of production.

The bane of manufacture in all lines in recent years has been restriction of production, and the great problem before our manufacturers is to get workmen to see that a low rate of output per dollar of wages is bound to keep prices up and prolong indefinitely the high cost of living.

THE NEW ANTI-TRUST BILL

Labor Unions Not to Be Exempt From Its Penalties if Their Acts are Illegal

WASHINGTON, D. C., April 23, 1914.—Labor unions will not be exempt from the provisions of the anti-trust bill which will be reported from the House Committee on the Judiciary if the members of the committee adhere to the programme adopted. The Clayton bill, which was introduced last week, was referred to the committee and it has held two meetings for the consideration of the measure. At the last one, it was decided that the bill should be reported in practically the form as introduced. Before introducing the measure Chairman Clayton of the Judiciary Committee held numerous conferences with President Wilson, and he states that the latter approves the measure and the provisions regarding labor or other organizations.

Representatives of labor unions who have been here for some time, headed by Samuel Gompers, president American Federation of Labor, whose headquarters are in Washington, are thoroughly aroused over the matter. They see that finally a committee of Congress has taken a decided step with regard to labor unions; that in the fight for exemption these unions have sustained a severe loss, and that if the legislation goes through, the labor organizations and their leaders, particularly the latter, will be subject to Federal laws. Chairman Clayton explains that throughout the bill the principle of "personal guilt" is applied to all offenses held to be unlawful.

Section 6 of the Clayton bill gives a legal status to labor unions, but does not except them or their officers for prosecution for acts that are declared by the anti-trust laws to be illegal. However, there are provisions in the bill limiting the power of Federal courts in issuing injunctions and providing jury trials in cases of indirect contempts. Section 6 provides:

That nothing contained in the anti-trust laws shall be construed to forbid the existence and operation of fraternal, labor, consumers', agricultural or horticultural organizations, orders or associations operating under the lodge system, instituted for the purposes of mutual help, and not having capital stock or conducted for profit, or to forbid or restrain individual members of such orders or associations from carrying out the legitimate objects of such associations.

This provision does not estop prosecutions of labor unions if they commit acts that are held by the bill to be illegal. In addition to this the bill leaves the Sherman act undisturbed.

Sections 1 to 5 of the bill deal with price discriminations. It is made a misdemeanor, punishable by fine not exceeding \$5000, or imprisonment not exceeding one year or both, in the discretion of the court, for any person to discriminate between purchasers and communities in the matter of prices with a view to injuring or destroying the business of a competitor. Section 7 relates to holding companies. It prohibits a corporation from acquiring control over a competitor where such acquisition might tend to the creation of a monopoly in any line of business. The prohibition does not apply to corporations purchasing stock solely for investment purposes. Other sections cover interlocking directorates, etc.

The committee will not give any hearings on the measure, according to present plans, and it is the intention to report it to the House by May 10.

The trade commission bill which has been reported by the House Committee on Interstate and Foreign Commerce will probably be taken up for consideration in the House when the naval appropriation bill is passed. This will be some time during the present week.

W. L. C.

Steel Corporation's Annual Meeting.

The annual meeting of the United States Steel Corporation in Hoboken, N. J., Monday, April 20, was one of the most remarkable corporation meetings ever held. Six rolling-mill and blast-furnace workers appeared as owners of the corporation's stock, not as employees, and in an open discussion of working conditions in the industry, which followed a report presented by Chairman E. H. Gary on the 12-hour work day, these shareholders supported the policy of the corporation in all particulars mentioned. The report was prepared by a special committee consisting of Chairman Gary, President James A. Farrell and Percival Roberts, Jr., a director. It was in part as follows:

You have been previously informed that the 12-hr. day is confined almost entirely to departments, such as blast furnaces and rolling mills, where operations must be continuous throughout the 24 hrs., although the hours of labor of workmen employed in them are intermittent, because of intervals during operations. The nature of these operations is such that the workmen are actually employed less than two-thirds of the time. Owing to the peculiar conditions surrounding these operations, it is the practice in the industry to divide the day into two turns of 12 hr. each, and the only change which could be made would be to divide into three turns of 8 hr. each, but in that case the labor would be so much reduced that remuneration to workmen necessarily would be diminished.

Our experience in eliminating seven-day labor shows that any plan under which the men earn less results in the loss of many of the best workmen, who seek and find employment where such restrictions are not enforced. Through the discontinuance of seven-day labor, upward of 4000 men left our employment within a very short period during 1913 and found employment where they could earn their accustomed seven days' wages per week; notwithstanding this, we have adhered to our six-day schedule.

From our investigation of the subject it is believed that the 12-hr. day is not physically detrimental to the men, because the work is intermittent, and for the further reason that the introduction of machinery has eliminated most of the physical labor.

The welfare of the workmen and of the corporation is dependent upon the prosperity of the iron and steel industry in this country, which, in turn, depends upon good general business conditions. The general average of prices for iron and steel products that has prevailed for nearly a year past has been on a very low level and the margin between selling prices and cost of production is much smaller than has prevailed at any time during the past 15 years, with the exception of a short period in 1911, and affords a low rate of return on the actual value of the capital employed. The large tariff reductions have brought many of our largest markets into strong competition with foreign iron and steel makers whose employees work 12 hr. a day at wages averaging 50 per cent, or less of the rates paid in this country. Under all these circumstances it seems clear to the committee that such a radical change as the one suggested cannot be made at present. Leaving out of consideration employees engaged on railroad trains, ships and in general administrative work, only 22.5 per cent. of our employees work 12 hr. a day; and we are making efforts to further improve conditions.

During the year \$2,564,839 was paid out for the relief of injured workmen. The corporation's pensioners numbered 2092 on Dec. 31, 1913, and the amount distributed to beneficiaries of the pension fund was \$422,815. The total cost of sanitary work during 1913 was \$564,977, and the money paid out for improving the condition of the men was, all told, \$7,240,669.

Chairman Gary told the stockholders that the Finance Committee had considered the publication at certain intervals of figures on labor conditions and efforts made to help workmen, but the discovery that such a step would cost the corporation \$40,000 annually had brought the matter to a halt.

Samuel Wilkinson, an employee of the corporation, who voted 1300 shares of stock held by 921 fellow workmen, made a speech in which he said that he was present at the meeting at the request of stock-owning employees and no one else.

Samuel R. Maitland, who said that he was a boiler tender and had worked the 12-hr. day for 18 years, said that he was employed in the Carnegie Steel Company's plant at New Castle, Pa., and that from talk with his fellow workers he had learned that they all believed they got a square deal from the Steel Cor-

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poration. "This corporation," he said, "is doing more for humanity than is the United States Government. This company keeps men from being paupers." He ended his speech by uttering a prayer, in which he asked all present to join. He prayed for the employees and the officers and ended with "God bless the United States Steel Corporation."

R. K. Smith, another employee, who had worked the 12-hr. shift for 18 years, asserted that his health was still good, and went on: "If public speakers would investigate, they would not make the statements they sometimes do and which often result in legislation injuring the worker. Demagogues who pretend to be the friends of labor are often its greatest enemies."

J. S. Phipps was elected a director to succeed his father, Henry Phipps, and the other directors were re-elected.

The National Association of Manufacturers will hold its next annual meeting at the Waldorf-Astoria Hotel, New York City, Tuesday and Wednesday, May 19 and 20. The secretary's office for registration will open in the west foyer of the hotel at 10 a.m., May 18. The usual banquet will be held in the grand ballroom of the hotel on the evening of May 20. Tickets for the banquet will be \$10 for each person.

The Iron and Metal Markets

PRODUCTION FALLING

A 65 Per Cent. Rate of Operation

Reduction in Steel Pipe — Steel Ore Dock for Chilean Iron Mines

The drying up of new business in most forms of rolled products has been telling further on steel works operations, and the average of employed capacity is now probably 65 per cent. or under.

With the buying at such a low ebb, interest might be looked for in the business possibilities of the Mexican situation; but for obvious reasons the trade shows no such response to the events of the past few days as to the beginning of hostilities with Spain 16 years ago. Account is taken of the stimulus given to armament programmes by any conflict or friction between nations, but no early effect upon domestic trade is seen in the present clash except in the possible diversion of congressional attention from hurtful meddling with business.

It does not appear that consumers are holding up specifications on steel orders and buying from other makers for immediate needs. On such products as bars, plates and shapes there is too little variation between contract and current prices for much of that. On new business buyers are maneuvering for extreme concessions, but sellers take much the same attitude as in November and December—that the tonnage coming out is too small to provoke savage cuts.

Adjustment of capacity to demand is bringing down the pig iron output of the steel companies. Most of them accumulated pig iron in March and more furnaces are likely to go out soon, if demand does not pick up. Several stoppages on the merchant list are planned also where coke contracts run out with April.

The tendency of prices is recognized in the announcement of \$1 a ton reduction in standard steel pipe by the National Tube Company. This is a return to the prices prevailing before the advance of February 2.

Of the Northern Pacific order for 20,000 tons of rails, 14,000 tons went to the Illinois Steel Company and 3000 tons each to the Pennsylvania Steel and Cambria Steel companies. A Harriman line is in the market for 7000 tons. The Steel Corporation's 3500 hopper and gondola cars for its Bessemer and Missabe roads have been let—2250 to the Pressed Steel Car Company, 1000 to the Standard and 250 to the Ralston company. The L. & N. has ordered 1400 steel underframes. Of the 30,000 cars now under inquiry it is questioned if any large part will be bought before the rate decision.

At Chicago there is some inquiry for steel bars from the smaller makers of agricultural machinery and generally the implement trade is covered for but two months ahead. In the same way in some other lines, buying must be close at hand—the country's wear and tear minimum, which is quite well shown in current specifying, will bring it to pass.

The Steel Corporation has the contract to fabricate and erect 8000 tons of steel for the Bethlehem Steel Company's ore dock at Cruz Grande Bay, Chile, which is $4\frac{1}{2}$ miles from the latter company's

Tofo iron mines. It will be of the latest Lake Superior type.

Manufacturing operations are contributing a fair share of current structural orders—3200 tons in the past week for the new Taylor-Wharton plant at Easton, Pa., and 2200 tons for the open hearth works of the Massillon (Ohio) Rolling Mill Company.

Our wire rod shipments to Canada are not cut off summarily by the new tariff. Some good orders are looked for under the proviso of free entry for rods bought before June 6 and shipped before June 30.

The pig iron situation will be considered at a meeting of furnace companies in New York April 23. Makers in the Valley and Lake Erie districts apart from Buffalo footed up 50,000 tons greater shipments in March than in February and pulled down stocks more than 30,000 tons. But new business is distressingly small and there have been cases of both low and high quotations producing the same effect—the putting off of purchases.

Foreign reports are less favorable. Germany is piling up pig iron at a prodigious rate and lately fresh cuts have been made on some finished products for export. Bars are sold below 1c. at Antwerp.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	Apr. 22	Apr. 15	Mar. 18	Apr. 23
Pig Iron, Per Gross Ton:	1914.	1914.	1914.	1913.
No. 2 X, Philadelphia...	\$15.00	\$15.00	\$15.00	\$17.25
No. 2, Valley furnace...	13.25	13.25	13.25	15.25
No. 2, Southern, Cin'ti...	13.75	13.75	14.00	15.25
No. 2, Birmingham, Ala...	10.50	10.50	10.75	12.00
No. 2, furnace, Chicago*	14.25	14.25	14.25	16.75
Basic, del'd, eastern Pa...	14.25	14.25	14.00	16.50
Basic, Valley furnace...	13.00	13.00	13.00	15.75
Bessemer, Pittsburgh...	14.90	14.90	15.15	17.50
Malleable Bess., Ch'go...	14.25	14.25	14.25	16.75
Gray forge, Pittsburgh...	13.65	13.65	13.65	15.65
L. S. charcoal, Chicago...	15.75	15.25	15.25	18.00

Billets, etc., Per Gross Ton:

Bess. billets, Pittsburgh...	21.00	21.00	21.00	28.50
O.-h. billets, Pittsburgh...	21.00	21.00	21.00	29.00
O.-h. sheet bars, P'gh...	22.00	22.00	22.00	29.50
Forging billets, base, P'gh...	25.00	25.00	25.00	36.00
O.-h. billets, Phila.	23.40	23.40	23.40	30.00
Wire rods, Pittsburgh...	26.00	26.00	26.50	30.00

Old Material, Per Gross Ton:

Iron rails, Chicago.....	12.75	12.75	12.75	16.00
Iron rails, Philadelphia...	15.50	15.50	16.50	18.00
Carwheels, Chicago	11.50	11.50	11.75	16.75
Carwheels, Philadelphia...	12.00	12.00	12.25	14.50
Heavy steel scrap, P'gh...	11.50	11.50	12.25	14.00
Heavy steel scrap, Phila...	11.00	11.00	11.25	13.00
Heavy steel scrap, Ch'go...	10.00	9.50	9.75	12.50
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	14.50
No. 1 cast, Philadelphia...	13.00	13.00	13.00	13.75
No. 1 cast, Ch'go (net ton)	10.25	10.25	10.25	12.25

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Hess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.20	1.22½	1.25	1.57½
Iron bars, Pittsburgh...	1.30	1.30	1.35	1.70
Iron bars, Chicago.....	1.12½	1.12½	1.15	1.57½
Steel bars, Pittsburgh...	1.15	1.15	1.20	1.85
Steel bars, New York...	1.31	1.31	1.36	2.01
Tank plates, Pittsburgh...	1.15	1.15	1.15	1.70
Tank plates, New York...	1.31	1.31	1.31	1.76
Beams, etc., Pittsburgh...	1.15	1.15	1.20	1.70
Beams, etc., New York...	1.31	1.31	1.31	1.71
Skelp, grooved steel, P'gh	1.20	1.20	1.20	1.45
Skelp, sheared steel, P'gh	1.25	1.25	1.25	1.50
Steel hoops, Pittsburgh...	1.25	1.25	1.30	1.60

Sheets, Nails and Wire,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.90	1.90	1.95	2.25
Galv. sheets, No. 28, P'gh	2.90	2.90	2.95	3.50
Wire nails, Pittsburgh...	1.60	1.60	1.60	1.80
Cut nails, Pittsburgh...	1.65	1.65	1.65	1.70
Fence wire, base, P'gh...	1.40	1.40	1.40	1.60
Barb wire, galv., P'gh...	2.00	2.00	2.00	2.20

*The average switching charge for delivery to founders in the Chicago district is 50c. per ton.

Coke, Connellsburg,

	Apr. 22	Apr. 15	Mar. 18	Apr. 23
Per Net Ton at Oven:				
Pork coke, prompt...	\$1.85	\$1.90	\$1.90	\$2.25
Furnace coke, future...	2.00	2.00	2.00	2.25
Foundry coke, prompt...	2.40	2.40	2.40	3.00
Foundry coke, future...	2.50	2.50	2.65	3.00

Metals.

Per lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
New York, 14.75	14.75	14.75	15.75	
Lake copper, New York, 14.25	14.37 1/2	14.25	15.62 1/2	
Electrolytic copper, N. Y.	5.00	5.10	5.15	5.45
Solder, St. Louis.....	5.15	5.25	5.30	5.60
Solder, New York.....	3.70	3.67 1/2	3.90	4.37 1/2
Lead, St. Louis.....	3.80	3.80	4.00	4.50
Lead, New York.....	35.60	36.40	38.40	49.75
Tin, New York.....	6.75	6.75	6.75	8.50
Antimony, Hallett's, N. Y.	8.30	8.30	8.30	8.30
Turnplate, 100-lb. Box, P'g'h				

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22 1/2c.; Kansas City, 42 1/2c.; Omaha, 42 1/2c.; St. Paul, 32c.; Denver, 84 1/2c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.15c. base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, 1/4 in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, no base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft. are considered 1/4-in. plates. Plates over 72 in. wide must be ordered 1/4 in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

EXTRAS	Cents per lb.
charges under 1/4 in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9....	.25
Gauges under No. 9 to and including No. 10....	.30
Gauges under No. 10 to and including No. 12....	.40
Sketches (including straight taper plates), 3 ft. and over.....	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees, 3 in. and over, 1.15c. Extras on other shapes and sizes are as follows:

Cents per lb.	
I-beams over 15 in. ....	.10
H-beams over 18 in. ....	.10
Angles over 6 in. on one or both legs. ....	.10
Angles 6 in. on one or both legs, less than 1/4 in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, hand rail, car truck and conductor rail)....	.95
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909....	.20 to .80
Deck beams and bulb angles.....	.30
Bull rail tees.....	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Products.—Fence wire, Nos. 0 to 9 per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire and fence staples to jobbers, \$2; painted, \$1.60. Wire nails to jobbers, \$1.60. Prices of the foregoing wire products to dealers in carload lots are 5c. higher. Woven wire fencing, 73 1/2 per cent. off list for carloads; 72 1/2 off for 1000-rod lots; 71 1/2 off for less than 1000-rod lots.

The following table gives the price to retail mer-

chants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.									
Nos. 0 to 9	10	11	12 & 12 1/2	13	14	15	16		
Annealed	\$1.60	\$1.65	\$1.70	\$1.75	\$1.85	\$1.95	\$2.05	\$2.15	
Galvanized	2.05	2.05	2.10	2.15	2.25	2.35	2.75	2.85	

Wire Rods.—Bessemer, open-hearth and chain rods, \$2.6.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Steel.		Butt Weld		Iron.	
Inches	Black Galv.	Inches	Black Galv.	Inches	Black Galv.
1/8, 1/4 and 3/8	.72	52 1/2	1/8 and 3/8	.66	.47
1/2	68 1/2	66 1/2	1/2	.65	.46
5/8 to 1	74	74	5/8	.69	.56
3/4 to 2	80	71 1/2	3/4	.72	.61

Lap Weld	
2	.77
2 1/2 to 6	.78
3 to 12	.76
13 to 15	.53

Reamed and Drifted	
1 to 3, butt	.78
2, lap	.75
2 1/2 to 6, lap	.77

Butt Weld, extra strong, plain ends	
1/8, 1/4 and 3/8	.68
1/2	.73
5/8 to 1 1/2	.77
2 to 3	.78

Lap Weld, extra strong, plain ends	
2	.74
2 1/2 to 4	.76
4 1/2 to 6	.79
7 to 8	.68
9 to 12	.63

Butt Weld, double extra strong, plain ends	
1/2	.63
3/4 to 1 1/2	.66
2 to 2 1/2	.68

Lap Weld, double extra strong, plain ends	
2	.64
2 1/2 to 4	.66
4 1/2 to 6	.65
7 to 8	.58

To the large jobbing trade an additional 5 and 2 1/2 per cent. is allowed over the above discounts.
The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from January 2, 1914, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
1 1/4 and 2 in.	.61	1 1/2 in.	.45
2 1/4 in.	.58	1 3/4 and 2 in.	.49
2 1/2 and 2 3/4 in.	.64	2 1/2 in.	.45
3 and 3 1/4 in.	.69	2 1/2 to 2 3/4 in.	.54
3 1/2 and 4 1/2 in.	.71	3 and 3 1/4 in.	.57
5 and 6 in.	.64	3 1/2 to 4 1/2 in.	.60
7 to 13 in.	.61	5 and 6 in.	.49

Locomotive and steamship special charcoal grades bring higher prices.
2 1/2 in. and smaller, over 18 ft., 10 per cent. net extra.
2 3/4 in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets		Cents per lb.	
Nos. 3 to 8		1.35	
Nos. 9 to 10		1.40	
Nos. 11 and 12		1.45	
Nos. 13 and 14		1.50	
Nos. 15 and 16		1.60	

Box Annealed Sheets, Cold Rolled	
Nos. 10 and 11	1.55
No. 12	1.53
Nos. 13 and 14	1.60
Nos. 15 and 16	1.65
Nos. 17 to 21	1.70
Nos. 22 and 24	1.75
Nos. 25 and 26	1.80
No. 27	1.85
No. 28	1.90
No. 29	1.95
No. 30	2.05

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.90
No. 12	2.00
Nos. 13 and 14	2.00
Nos. 15 and 16	2.15
Nos. 17 to 21	2.30
Nos. 22 and 24	2.45
Nos. 25 and 26	2.60
No. 27	2.75
No. 28	2.90
No. 29	3.05
No. 30	3.20

Pittsburgh

PITTSBURGH, PA., April 22, 1914.

Nothing of an encouraging nature can be given in this report in regard to conditions existing in the steel business. Pessimism is rampant. Not enough of either raw or finished material is being sold to establish prices, which are weak all along the line. The efforts of the steel companies to hold plates, shapes and bars at 1.15c. is successful so far, but very little new business is coming out. The National Tube Company has increased discounts on black and galvanized steel pipe one-half point on all sizes, equal to a reduction of \$1 a ton, effective from Monday, April 20. Sheets are extremely dull. Scrap and coke are both neglected. The expected April buying movement has not developed, but there is still hope that more activity will come in May. Operations among the steel mills are on a basis of not over 60 per cent., with some mills running 50 per cent. or less.

Pig Iron.—The local market is stagnant. There is no new inquiry. Several furnaces in the two valleys, whose coke contracts run out in April, have not yet contracted for May delivery, indicating that they are seriously considering the matter of going out. Basic is still nominally \$13 and Bessemer \$14, but not a single sale was reported in the past week. We quote: Bessemer, \$14; basic, \$13; No. 2 foundry, \$13.25 to \$13.50; gray forge, \$12.75 to \$13; malleable Bessemer, \$13.25, for delivery through first half of this year, all at Valley furnace, the freight rate to the Pittsburgh or Cleveland district being 90c. a ton.

Billets and Sheet Bars.—No new inquiry has appeared for billets or sheet bars. Prices are weak. Some of the smaller steel mills are offering open-hearth billets at about \$20 and open-hearth sheet bars about \$21, makers' mills, but the large steel companies are still quoting \$21 for Bessemer and open-hearth billets and \$22 for Bessemer and open-hearth sheet bars, although they say they are getting practically no new orders. Specifications from the sheet mills have fallen off very much, owing to the slack demand for sheets. We quote Bessemer and open-hearth billets at \$21 and Bessemer and open-hearth sheet bars at \$22, f.o.b. makers' mills, Pittsburgh or Youngstown, for April shipment; forging billets, \$25 on desirable specifications, embracing only one size, and up to but not including 10 x 10 in., the regular extras being charged for larger sizes. On small orders forging billets are held at \$26. We quote axle billets at \$23 for desirable orders and \$24 for small orders.

Muck Bar.—We quote, nominally, best grades, made from all pig iron, at \$27.50, delivered to buyers' mills in the Pittsburgh district. Eastern muck bar is being offered here at about \$1 a ton less.

Steel Rails.—The local company has taken 2500 tons of open-hearth standard sections for the Wabash Railroad. The new demand for light rails is only fair. A good deal of the business being placed is going to the rerolling mills at lower prices than are quoted for light rails rolled from billets. We quote splice bars at 1.50c.; standard section Bessemer rails, 1.25c.; open-hearth standard sections, 1.34c., f.o.b. Pittsburgh. We quote light rails rolled from billets as follows: 25, 30, 35, 40 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots, these prices might be slightly shaded.

Plates.—The Bessemer & Lake Erie has placed 2500 steel hopper and gondola cars, and the Duluth, Missabe & Northern 1000 of the same types. No new

inquiries for steel cars have come out, and the new demand for plates is very light. Some of the plate mills are not running at over 50 per cent. of capacity and others at a less rate. We quote 1/4-in. and heavier plates at 1.15c., Pittsburgh.

Structural Material.—Several large jobs figured on some time ago are being held back and may not be placed. New inquiry is light. The Fort Pitt Bridge Works has taken 2100 tons for new steel buildings for the open-hearth plant of the Massillon Rolling Mill Company, Massillon, Ohio. We quote beams and channels up to 15-in. at 1.15c., f.o.b., Pittsburgh.

Iron and Steel Bars.—Orders for both iron and steel bars are only for small lots, while specifications against contracts have fallen off very much, especially from the car builders and implement makers. The latter trade is specifying for steel bars at a much less rate than for several years. We quote steel bars at 1.15c. to 1.20c. and common iron bars at 1.30c. to 1.35c., f.o.b. makers' mills, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: 3/4-in. and over, \$1; 1/2 to 11/16 in., \$1.50; under 1/2 in., \$2.50 per net ton. These extras are not always observed, and mills that roll steel bars from old rails sometimes entirely omit them.

Ferroalloys.—Practically no new business is being done in either ferromanganese or ferrosilicon. Dealers are still quoting 80 per cent. English ferromanganese at \$39, Baltimore, but this would be shaded probably \$1 a ton if any new business was offered. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$7; over 100 tons to 600 tons, \$7.20; over 600 tons, \$7.10, delivered in the Pittsburgh district. We quote 10 per cent. ferrosilicon at \$19.50; 11 per cent., \$20.50, and 12 per cent., \$21.50, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnaces. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12 1/2c. in less than 2000-lb. lots.

Wire Rods.—Under the new Canadian tariff, effective from April 6, wire rods exported from this country will take a duty of \$3.50 per ton, except when these rods are to be turned into 9, 12 and 13 gauge fence wire. When Canadian manufacturers draw the rods into such wire, they will be allowed a rebate of 99 per cent. on the duty. The new law also provides that all contracts for wire rods placed in this country by Canadian manufacturers prior to June 6 will be admitted free of duty until June 30, so that American manufacturers of wire rods expect very good specifications from Canadian manufacturers between now and May 30. Several local makers state they have already received specifications against contracts for rods for shipment to Canada taken some time ago. The domestic demand for wire rods is quiet, and prices are weak. On small lots probably \$26 could be obtained, but on desirable orders \$25.50 could be done. We quote Bessemer, open-hearth and chain rods at \$26, Pittsburgh, for small lots.

Skelp.—There is no new demand for skelp, as business with the pipe mills is very dull and they are not buying. We quote: Grooved steel skelp, 1.20c. to 1.25c.; sheared steel skelp, 1.25c. to 1.30c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.65c. to 1.70c., delivered to consumers' mills in the Pittsburgh district.

Sheets.—The condition of the sheet trade is unsatisfactory both as to new demand and prices. Hardly enough new business is coming out to test the market, but Nos. 9 and 10 blue annealed sheets are not above 1.40c.; No. 28 black sheets, 1.90c., and No. 28 galvanized, 2.90c. These prices have been shaded \$1 a ton in certain districts. One leading mill is holding No. 28 black at 2c. and No. 28 galvanized at 3c., but is not securing business at these prices. Specifications against contracts are not coming in freely. As a rule, sheet mills are not operating to over 50 per cent. of capacity. We quote Nos. 9 and 10 blue annealed sheets at 1.40c.; No. 28 Bessemer black sheets, 1.90c.; No. 28 galvanized, 2.90c.; No. 28 tin mill black plate, H. R. and A., 1.90c.; Nos. 29 and 30, 1.95c. These prices are f.o.b., Pittsburgh, in carload lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—Specifications against contracts are coming in at a good rate, and all the mills are running practically full. Some new buying has developed in the last few days, one purchaser taking 8000 boxes at a price somewhat higher than could have been obtained a month or so ago. Another buying movement is looked for in May or early in June, as prospects are that some large consumers will find they have not bought enough. On current orders we quote 100-lb. cokes at \$3.30 to \$3.40 and 100-lb. ternes at \$3.20 to \$3.30 per base box f.o.b., Pittsburgh.

Wire Products.—The report that the Jones & Laughlin Steel Company, Pittsburgh, has taken a contract for 20,000 kegs of wire nails for the Navy Department is incorrect. It has taken a contract for the requirements of the Navy Department over the next year, which will aggregate 1800 to 2000 kegs only. There is practically no new business in wire nails, the mills running almost wholly on contracts placed some time ago, some of which have been extended for later delivery. On the small amount of current business that is being placed \$1.60 is being generally observed, but in some districts, notably Cincinnati and points further South, \$1.55 is being done to meet local competition. Regular prices are as follows: Wire nails, \$1.60; plain annealed wire, \$1.40; galvanized barb wire and fence staples, \$2; painted barb wire, \$1.60, all per 100 lb., f.o.b. Pittsburgh, with actual freight charge to point of delivery, terms being 30 days net less 2 per cent. off for cash in 10 days. We quote cut nails at \$1.65, f.o.b. Pittsburgh. Discounts on woven wire fencing are 73½ per cent. off in carload lots, 72½ per cent. off on 1000-rod lots and 71½ per cent. on less than 1000-rod lots, all f.o.b. Pittsburgh.

Hoops and Bands.—The new demand is light and only for small lots, consumers of both hoops and bands being covered to July or longer on contracts placed some time ago. Specifications against these contracts are not heavy. We quote steel bands at 1.15c., with extras as per steel-bar card, and steel hoops at 1.25c., f.o.b. Pittsburgh.

Shafting.—Specifications against contracts for shafting from the automobile and implement makers are reported to be a little better, but there is still room for improvement. The new demand does not represent more than 35 to 40 per cent. of capacity. We quote cold-rolled shafting in carload and larger lots at 64 to 65 per cent. off, and in small lots from 61 to 63 per cent. off, delivered in base territory, depending on the order.

Merchant Steel.—The new demand is for small lots only to meet current needs, and mills report specifications against contracts not satisfactory. With the return of good weather and the opening up of the reasonable demand for certain kinds of steels, the mills expect a larger volume of business. On the small amount of new business being placed, prices are as follows: Iron finished tire, ½ x 1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅔ and 1 in., 1.80c. to 1.90c.; 1½ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Spikes.—The Chesapeake & Ohio has finally closed for 3000 kegs, half going to the Tredegar Iron Company and the half to the Illinois Steel Company. The Jones & Laughlin Steel Company has taken 500 kegs of spikes for shipment to Panama. The new demand is dull and railroads are not specifying against contracts they placed early in the year. We quote standard sizes of railroad spikes at \$1.40 to \$1.45 and small railroad and boat spikes at \$1.50 to \$1.55 per 100 lb., f.o.b. Pittsburgh.

Standard Pipe.—Effective Monday, April 20, the National Tube Company and other pipe mills increased discounts on black and galvanized steel pipe one-half point, equal to a reduction of about \$1 a ton. New cards have

been issued, quoting the lower discounts. The current demand for merchant iron and steel pipe is quiet, and mostly for small lots. The season for pipe laying for gas and oil lines will soon open up, and two or three large projects are in the market, but have not reached the stage where reference can be made to them. The outlook this year for a good volume of business in the larger sizes of pipe, used in gas and oil lines is fairly good, particularly in the far Western gas and oil territory. As a rule pipe mills are operating to only 50 to 60 per cent. of capacity.

Boiler Tubes.—The market on merchant and boiler tubes is still unsatisfactory, the demand being quiet and prices materially shaded. It is said that none of the mills making boiler tubes is running to more than 50 per cent. of capacity.

Old Material.—There is no buying by consumers, all the scrap they are taking in at present coming to them on contracts placed some time ago. As yet there is no speculative buying, as with the dull outlook for trade consumers believe that prices of scrap have not touched bottom. Sales are few and small. We note sales of about 300 tons of borings at \$7.50, about 800 tons of ordinary steel scrap at \$11.75 and 600 tons of selected heavy steel scrap at \$12.25, delivered to consumers' mills. Dealers are now quoting, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$12.00 to \$12.25
Ordinary steel melting scrap	11.50 to 11.75
Compressed side and end sheet scrap	10.50 to 10.75
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.50 to 8.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.75 to 13.00
No. 1 railroad malleable stock	11.00 to 11.25
Railroad grate bars	10.25 to 10.50
Low phosphorus melting stock	14.50 to 14.75
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	10.25 to 10.50
No. 2 busheling scrap	7.25 to 7.50
Machine shop turnings	7.50 to 7.75
Old carwheels	11.25 to 11.50
Cast-iron borings	7.75 to 8.00
Sheet bar crop ends	12.00 to 12.25
Old iron rails	13.75 to 14.00
No. 1 railroad wrought scrap	11.50 to 11.75
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	12.00 to 12.25

+Shipping point.

Coke.—Practically no new demand is coming out for furnace or foundry coke, either on contracts or for prompt shipment. Operators are getting ready to blow out ovens, owing to the heavy decline in the demand. The H. C. Frick Coke Company has already put out about 1300 ovens. Some consumers of furnace coke who are covered for April only have not yet bought for May, being undecided whether to continue their furnaces in blast or not. A leading Cleveland furnace interest has sent out an offer of \$1.75 per net ton at oven. Standard makes of blast-furnace coke for prompt shipment are quoted at \$1.85 to \$1.90, but three or four of the leading makers are holding for \$2 for delivery up to July. Prices on standard 72-hr. foundry coke range from \$2.40 to \$2.50 at oven, but several makers of coke that have a high reputation for quality are holding at \$2.75. The Connellsville Courier reports the output in the Upper and Lower Connellsville regions for the week ended April 11 as 354,725 net tons, a decrease over the previous week of about 1700 tons.

Chicago

CHICAGO, ILL., April 22, 1914.—(By Wire.)

The mills of business are grinding slowly indeed. For encouragement those who are not entirely out of patience with the situation are turning to the excellent crop prospects and to the fact that orders now delayed in placing are of necessity piled up for the future. The dark side of the picture has many details but may be summed up in the words "lack of business." Buyers are exacting extreme concessions upon the smallest orders. About the only desirable feature connected with

the placing of such business, is the fact that immediate shipments are asked. The Northern Pacific Railway placed orders for 20,000 tons of rails and there is some additional inquiry. Structural trade is slowing down. Specifications are fewer in number and leaner in tonnage in nearly every line. Contracting is at a standstill and the only evidence of interest in the future centers around a few inquiries for steel bars for the coming year. The buying of pig iron is confined to carload business. In the scrap market, prices of those grades of material which can be used by the steel mills show a slight advance as the result of recent buying.

Pig Iron.—Transactions are still limited to small lots running from carloads to 200 tons and of these there is a striking scarcity. For the Lake irons the price remains on the basis of \$14.25, f.o.b. furnace, for No. 2 foundry and for Southern iron the bottom of the market remains at \$10.50, Birmingham, but those irons which have been held at \$11 are now obtainable at \$10.75. The charcoal-iron situation appears to be somewhat similar to that governing the local furnaces, in that higher prices are now being maintained during a period of very limited selling, whereas lower quotations were the rule at a time when attractive tonnage was offering. The Michigan charcoal furnaces seem to be holding their iron at a minimum of \$14 at the furnace but the lack of interest places but little pressure on this quotation. On the basis of \$14 at furnace, the price of charcoal iron delivered at Chicago would be \$1 a ton higher than No. 2 foundry, and it seems unlikely that any considerable tonnage could be moved at that premium should business revive. Local furnaces report shipments about equal to their make but the charcoal-iron producers' stocks in furnace yards are heavy and increasing. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	\$15.75
Northern coke foundry, No. 1	\$14.75 to 15.00
Northern coke foundry, No. 2	14.25 to 14.75
Northern coke foundry, No. 3	14.00 to 14.25
Southern coke, No. 1 f'dry and 1 soft	15.35 to 15.85
Southern coke, No. 2 f'dry and 2 soft	14.85 to 15.35
Southern coke, No. 3	14.35 to 14.85
Southern coke, No. 4	13.85 to 14.35
Southern gray forge	13.35 to 13.85
Southern mottled	13.10 to 13.35
Malleable Bessemer	14.25 to 14.50
Standard Bessemer	17.00
Basic	13.75 to 14.25
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

(By Mail)

Rails and Track Supplies.—The distribution of 20,000 tons of open-hearth rails by the Northern Pacific Railway included the award of 14,000 tons to the Illinois Steel Company and 3000 tons each to the Pennsylvania Steel Company and Cambria Steel Company. In addition to the inquiry of the Missouri Pacific for 10,000 tons of rails, still outstanding, one of the southwestern branch lines of the Harriman system is in the market for 7000 tons. In other respects the railroad situation remains unchanged. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 2c. to 2.10c., base, all in carload lots, Chicago; tie plates, \$26 to \$28 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Contracts for fabricated steel closed during the past week include the following: Southern Title & Trust Company Building, San Diego, Cal., 400 tons to the Baker Iron Works; Chicago, Milwaukee & St. Paul Railway, 103 tons to the Modern Steel Structural Company; the Texas & Pacific Railway Company, 179 tons to the American Bridge Company; the Hennepin Ave. Methodist Church, Minneapolis, 400 tons to the Fargo Bridge & Iron Company; The Anaconda Copper Mining Company, 1645 tons to the Minneapolis Steel & Machinery Company; the Sealy Hospital, Galveston, Texas, 259 tons to the American Bridge Company. Gradual weakening in price of structural material bears witness to a taper-

ing off in tonnage. There is little or no contracting for the future and buyers are ordering only that which they have immediate occasion to use. For the most desirable tonnage placed in the last fortnight 1.33c., Chicago, has not been a bottom price. We quote for Chicago delivery from mill in carload lots, 1.33c. to 1.38c., Chicago.

The demand for material from store is admittedly below normal, but the hand to mouth buying of many consumers results in the placing of considerable business with the jobbers that would otherwise go to the mills. We quote for Chicago delivery from store for plain shapes 1.75c.

Plates.—The last week brought a lull in the Western car business except for a few scattering orders for passenger equipment. The mills find no change in their impoverished condition as to plates and regular customers are able to place their prompt shipment specifications at 1.15c., Pittsburgh, or better. We quote for Chicago delivery from mill 1.33c.

We quote for Chicago delivery of plates from store 1.75c.

Sheets.—A decreasing interest is being displayed by users of sheets and the mills report their shipments considerably in excess of their bookings of new specifications. For forward delivery the quotations in effect a week ago still appear to obtain, but for immediate shipment specifications some of the mills appear willing to accept prices equivalent to 1.85c., Pittsburgh, for black sheets. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.53c.; No. 28 black, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.

For sheets out of store we quote for Chicago delivery as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.45c. to 2.55c.; No. 28 galvanized, 3.50c. to 3.60c.

Bars.—A few instances of interest in steel bars for delivery after July 1 are noted in the form of letter inquiries from some of the smaller implement manufacturers. The mills, however, are far from being interested in that question. A fair run of orders for reinforcing bars is reported, but the demand is less than the trade expects at this time of the year. Bar iron tonnage is light and scattering and prices are again at a very low ebb. We quote for mill shipments as follows: Bar iron, 1.12½c. to 1.15c.; soft steel bars, 1.33c.; hard steel bars, 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Hoops and Bands.—New business in hoops and bands continues decidedly light and in this territory the effect of competition upon prices is not altogether absent. We quote for Western delivery for bands 1.33c. to 1.38c., Chicago and for hoops 1.43c. to 1.48c.

Rivets and Bolts.—Carload orders for rivets represent the best that can be said of this situation while for bolts the demand is even more meager and unprofitable. We quote from mill as follows: Carriage bolts up to $\frac{1}{2} \times 6$ in., rolled thread, 80-5; cut thread, 80; larger sizes, 75-5; machine bolts up to $\frac{3}{8} \times 4$ in., rolled thread, 80-10; cut thread, 80-5; larger sizes, 75-10; coach screws, 80-15; hot pressed nuts, square head, \$6.20 off per cwt.; hexagon, \$7 off per cwt. Structural rivets, $\frac{1}{2}$ to $\frac{1}{4}$ in., 1.73c. to 1.78c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.35c.; boiler rivets, 2.55c.; machine bolts up to $\frac{3}{4} \times 4$ in., 75-10; larger sizes, 70-10-5; carriage bolts up to $\frac{3}{8} \times 6$ in., 75-5; larger sizes, 70-10 off, hot pressed nuts, square head, \$6.00, and hexagon, \$6.70 off per cwt.

Wire Products.—The buying of fence and barb wire continues at a fairly satisfactory rate. Some of the mills also report that they are behind in their deliveries of manufacturers' wire but the movement of wire nails is disappointing. As regards prices, the market has been stronger. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.18; polished staples, \$1.78; galvanized, \$2.13, all Chicago.

Cast-Iron Pipe.—During the week the leading interest took contracts for 200 tons for Albany, Wis., 250 tons for Swift Current and 500 tons for Humboldt.

both in Saskatchewan, Can. The contract awarded at South Bend, Ind., for from 300 to 800 tons was placed with the Lynchburg Foundry Company. A letting of 200 tons at Jackson, Mich., is scheduled for this week. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for gas pipe.

Old Material.—Following the sale of heavy melting steel from this territory into eastern markets, local consumers found it necessary to advance their price to the basis of \$10 in order to hold this grade of scrap for delivery in the West. Our quotation is accordingly advanced although the general status of the market as regards demand and supply is practically unchanged. The steel mills are also using No. 2 railroad wrought and cut forge with their shoveling steel grades and in consequence prices for these grades are higher, eliminating almost entirely the usual spread between No. 1 railroad wrought and No. 2. The offerings of railroad scrap for sale this week total 15,000 tons and include 7000 tons by the Rock Island System, 2500 tons by the St. Paul, 3400 tons by the Burlington, 1400 tons by the Nickel Plate, 650 tons by the Chicago & Eastern Illinois, 425 tons by the Chicago & Alton and 100 tons by the Grand Trunk Railway. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	\$12.75 to \$13.25
Old steel rails, rerolling	11.50 to 12.00
Old steel rails, less than 3 ft.	10.50 to 11.00
Riveting rails, standard section, sub-jet to inspection	24.00
Old carwheels	11.50 to 11.75
Heavy melting steel scrap	10.00 to 10.25
Frogs, switches and guards, cut apart	10.00 to 10.25
Shoveling steel	9.00 to 9.25
Steel axle turnings	6.75 to 7.25

Per Net Ton

Iron angles and splice bars	\$12.25 to \$12.75
Iron arch bars and transoms	12.25 to 12.75
Steel angle bars	9.00 to 9.50
Iron car axles	17.50 to 18.00
Steel car axles	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.75 to 9.25
Cut forge	8.00 to 8.50
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.50 to 10.00
Locomotive tires, smooth	10.00 to 10.25
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
No. 1 busheling	7.50 to 8.00
No. 2 busheling	6.00 to 6.50
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	10.25 to 10.50
Stove plate and light cast scrap	9.25 to 9.75
Grate bars	9.00 to 9.50
Railroad malleable	9.25 to 9.75
Agricultural malleable	8.25 to 8.75
Pipes and tues	6.75 to 7.25

Philadelphia

PHILADELPHIA, PA., April 21, 1914.

The quiet of recent weeks is unabated, except that in structural material there has been a better movement, because of the development of old inquiry. All minds are concerned over the Mexican situation, and the opinion is generally expressed that a conflict might help business. Pig iron continues monotonously dull. Cast-iron pipe has been subject to cutting. Structural material and steel bars are weak at 1.15c., Pittsburgh. Plates are a little irregular, both as to demand and price. Sheets have picked up a little. Old material is dull.

Pig Iron.—The market is flat, the depression being even more acute than heretofore. Buying of eastern Pennsylvania No. 2 X foundry iron has been restricted to prompt delivery lots of a few tons each. Some of the pipe makers are understood to have bought some odd lots of low-grade iron which were to be had cheap, although they had no urgent need to add to their supply. In some cases this trade has been offered iron of such inferior quality that it was pronounced not worthy of consideration, low as the price was. There is not enough demand for Northern iron to demonstrate just to what extent prices have weakened, though they unquestionably are softer. Makers of Virginia iron have taken 25c. off their quotations for No. 2 plain, making the price \$15.30 to \$15.55 delivered

here, with the price of No. 2 X unchanged. These grades share the general inactivity. Steel-making irons have been dull, with practically the only interest shown being in English hematite or low-phosphorus iron. In small quantities this iron has been coming here for some time. The price paid was around \$20, tidewater, so that with American low-phosphorus iron selling at \$21 it is possible for the English iron to undersell the domestic if it is not carried too far into the interior. There are at least two importers. Meanwhile, arrivals of Nova Scotia iron have continued and another cargo is looked for shortly. Total pig-iron imports from England in the week ended April 18 were 4049 tons. The following range of prices about represents the market for near delivery in buyers' yards in this district, with the minimum probably nearer the actual market:

Eastern Penna. No. 2 X foundry	\$15.00 to \$15.25
Eastern Penna. No. 2 plain	14.75 to 15.00
Virginia No. 2 X foundry	15.55 to 15.75
Virginia No. 2 plain	15.30 to 15.55
Gray forge	14.60
Basic	14.25
Standard low phosphorus	21.00

Iron Ore.—The only interest is in what the future may bring with regard to Lake prices, but there is so far no indication of what this will be. In the week ended April 18 there were landed at this port 4800 tons of ore from French Africa and 5100 tons from Cuba.

Ferroalloys.—There are practically no sales of or inquiries for standard ferroalloys. English 80 per cent. is unchanged at \$39, seaboard, and German at \$38. Ferrosilicon, 50 per cent., is quoted at \$71 to \$73, Pittsburgh, according to quantity. There is an inquiry out for a carload of 11 per cent. furnace ferrosilicon which sells at about \$24.30 delivered here.

Cast-Iron Pipe.—Quotations have varied somewhat because of the tendency of some makers to accept concessions in order that they may clear their yards of stocks, but this condition is said to be practically over and a more even market is now looked for. The volume of inquiry keeps up fairly well, although there is no large tonnage in sight except in New York City. The average quotation for 6-in. pipe is about \$21.50 per net ton, standard weight, in carload lots, at the foundry, with 4-in. \$2 higher, and larger sizes 50c. less.

Billets.—Specifications do not run far ahead, but they hold up to about 60 per cent. of the capacity of the mills in this district. Open-hearth rolling billets are quoted at \$23.40 to \$24.40. For forging steel an advance of \$4 to \$5 per ton.

Structural Material.—The largest piece of business which has been pending here, the Bell Telephone Company Building, into which about 4000 tons will go, has been awarded to the Keystone Structural Company. There has been, on the whole, a little more business, but it has all been anticipated. Prices are not regarded with satisfaction by sellers. A buyer can easily do 1.15c., Pittsburgh. Awards have not yet been made for the 1000 tons to go into the new breaker of the Delaware, Lackawanna & Western Coal Company. The Eastern Steel Company will supply the shapes for the new building of the Methodist Board of Home Missions. The Pennsylvania Railroad has placed some orders for small bridges, running about 50 tons each. For a carload of angles for the Panama Canal the Lackawanna Steel Company was the lowest bidder at 1.4245c., delivered, with Jones & Laughlin, next lowest at 1.425c.

Plates.—The bulk of orders continue miscellaneous and widespread. A local maker still quotes 1.35c., Philadelphia, for carloads and 1.38c. for less than carloads, though admitting that more desirable business would be taken at 1.30c., Philadelphia. There has been shading of this lower price and desirable business would be taken in some quarters, on a basis of 1.12½c., Pittsburgh. In opening bids for 561 tons of plates which the Government will require at Panama, the bid of the Worth Brothers Company was 1.349c. delivered, while the United States Steel Products Company bid 1.359c. It is understood that the Carnegie Steel Company is to furnish 12,000 tons of plates and shapes which will be required for two colliers which the Maryland Steel Company is to build for the Government. The Worth

Brothers Company will supply the plates for a collier to be built by the Newport News Shipbuilding & Dry Dock Co.

Bars.—Iron bars are dull and easier at 1.12½c. at mill, or 1.20c., delivered. Bids have just been opened by the Reclamation Service for 1300 tons of deformed concrete reinforcement bars. The Jones & Laughlin Steel Company bid 1.19c., Pittsburgh, for twisted squares and 1.14c. for deformed bars. The Colorado Fuel & Iron Company bid 1.50c., Pueblo. Inasmuch as the bars are to be used in the West, the latter company is believed to have a good chance. The Inland Steel Company bid 1.30c., Chicago, and the Corrugated Bar Company 1.29½c., Chicago. When bids were opened on Saturday for 500 tons of reinforcing bars, the Concrete Steel Company was found to be the lowest bidder at 1.398c., delivered at Colon.

Sheets.—Since last week the demand for sheets has revived and the mills are running on a full basis again. For No. 10 blue annealed sheets, 1.55c., Philadelphia, is the quotation.

Old Material.—There is a little more inquiry but no sales of consequence. Some consumers are out of the market, but others would buy if sellers would accept the low price offered. The following quotations about represent the market for deliveries in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates varying from 35c. to \$1.35, per gross ton:

No. 1 heavy melting steel	\$11.00 to \$11.25
Old steel rails, rerolling	13.00 to 13.50
Low phosphorus heavy melting steel scrap	14.50 to 15.00
Old steel axles	15.00 to 15.50
Old iron axles	21.00 to 22.00
Old iron rails (nominal)	15.50 to 16.00
Old carwheels	12.00 to 12.50
No. 1 railroad wrought	13.25 to 13.75
Wrought-iron pipe	10.50 to 11.00
No. 1 forge fire	8.50 to 9.00
Bundled sheets	8.50 to 9.00
No. 2 light iron	5.00
No. 2 busheling	8.00 to 8.50
Wrought turnings	7.75 to 8.25
Cast borings	8.00 to 8.50
Machinery cast	13.00 to 13.50
Grate bars, railroad	8.50 to 9.00
Stove plate	9.00 to 9.50
Railroad malleable (nominal)	9.00 to 9.50

Coke.—As in pig iron, there has been some shopping around to get cheap coke, but apparently it has not led to sales at the prices offered. Most of the business has been in small lots for first half delivery. Standard Connellsburg furnace coke is quoted at \$1.90 to \$2 per net ton at oven for prompt and about \$2 on contract. Up to \$2.15 is asked for special qualities. Connellsburg foundry coke is quoted at \$2.40 to \$2.60 per net ton at oven, with some grades up to \$2.75 for both prompt and contract. Freight rates to this city from the producing districts are as follows: Connellsburg, \$2.05; Mountain, \$1.65; Latrobe, \$1.85.

Cleveland

CLEVELAND, OHIO, April 21, 1914.

Iron Ore.—The first ore cargo of the season was sent from Escanaba to-day and shipments from the head of the Lakes will probably be started about the end of the week. Some ore has been sold in the last few days to furnaces interested in the mines. However, the question of prices was not settled, the buyers agreeing to pay whatever is later established as the regular market price. Some of the mining companies that shut down their mines early in January have decided not to start them up again this season. The large steamers of the Pittsburgh Steamship Company will go into commission the latter part of next week. We quote 1913 prices as follows: Old range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; old range non-Bessemer, \$3.50; Mesaba non-Bessemer, \$3.40.

Pig Iron.—The market continues stagnant. No sales are reported by Cleveland firms against Eastern inquiries noted last week. Some of this business went to Eastern furnaces and other inquiries appear to have been only market feelers. The demand for iron on contracts is holding up well. Furnace men find satisfaction in reports that shipments from Valley, Detroit and Lake Erie furnaces outside of Buffalo, increased

50,000 tons in March from those of February and stocks were decreased 30,000 to 40,000 tons in the month. Prices are maintained at \$13.25 Valley furnace and \$14 Cleveland for No. 2 foundry. The Standard Sanitary Manufacturing Company has bought 500 tons of No. 2 Southern at \$10.50 at furnace and 500 tons of No. 3 at \$10 for delivery at its Louisville plant until July. We quote delivered Cleveland as follows:

Bessemer	\$14.90
Basic	\$13.90 to 14.00
Northern No. 2 foundry	14.25
Southern No. 2 foundry	14.85
Gray forge	13.50
Jackson Co. silvery, 5 per cent. silicon	17.55

Coke.—A few small lot sales of foundry coke are reported, but the market is generally quiet with prices unchanged at \$2.50 to \$2.75 per net ton for the best makes. Standard Connellsburg furnace coke is quoted at \$1.85 to \$1.95.

Finished Iron and Steel.—New demand shows a slight improvement as compared with the previous few weeks. An increase in the volume of orders for steel bar products is reported and structural material is slightly more active. Prices are generally maintained at 1.15c. for steel bars and structural material, 1.20c. being the usual quotation for small lots. While most mills are adhering to 1.15c. for plates, this price has been shaded \$1 a ton on desirable orders. The structural situation has improved somewhat and a fair volume of business is being figured on by Ohio fabricators. The Fort Pitt Bridge Works has taken 2200 tons for the open-hearth plant of the Massillon Rolling Mill Company, and the Bethlehem Steel Company 1200 tons for a hotel in Regina, Sask. A bridge in Hamilton County that will require 1500 tons of steel is being figured on. Specifications will be out shortly for the West Twenty-fifth street bridge in Cleveland, which will require several thousand tons of reinforcing bars. The demand for sheets is fairly good, particularly for black and blue annealed. Contracts are being placed at 1.90c. for No. 28 black, 2.90c. for No. 28 galvanized and 1.45c. for No. 10 blue annealed for delivery during the next sixty days and these prices are being shaded in some cases \$1 a ton for early delivery. Bar iron is very dull with prices unchanged at 1.20c. to 1.25c. Cleveland. We quote warehouse prices at 1.80c. for steel bars and 1.90c. for plates and structural material.

Old Material.—A flurry occurred in the market in the past week during which there was a fair amount of buying, but conditions have again settled back into inactivity. Some of the Valley mills bought heavy melting steel at \$12, and there was some activity in turnings, which were marked up 50c. a ton. Borings are also firmer and have become rather scarce. Only a limited amount of scrap has been offered at prevailing prices. Dealers do not believe that prices will go any lower and many are holding their material for an advance. We quote f.o.b. Cleveland as follows:

<i>Per Gross Ton</i>	
Old steel rails, rerolling	\$11.50 to \$12.00
Old iron rails	13.50 to 14.00
Steel car axles	15.00 to 15.25
Heavy melting steel	10.50 to 11.00
Old carwheels	11.50 to 12.00
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	10.75 to 11.00
Light bundled sheet scrap	7.50 to 8.00

<i>Per Net Ton</i>	
Iron car axles	\$18.00 to \$19.00
Cast borings	5.75 to 6.25
Iron and steel turnings and drillings	5.50 to 6.00
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new	8.75 to 9.00
No. 1 busheling, old	8.00 to 8.25
No. 1 railroad wrought	10.00 to 10.50
No. 1 cast	10.75 to 11.00
Stove plate	8.25 to 8.75

Bolts and Rivets.—New demand is light and prices are not firm. Rivet prices are unchanged at 1.55c. for structural and 1.65c. for boiler for desirable orders. We quote discounts as follows: Common carriage bolts, $\frac{1}{4}$ x 6 in. smaller or shorter, rolled thread, 80 and 5 per cent.; cut thread, 80 per cent.; larger or longer, 75 and 5 per cent.; machine bolts with h.p. nuts, $\frac{1}{4}$ x 4 in., smaller or shorter, rolled thread, 80 and 10 per cent.; cut thread, 80 and 5 per cent.; larger or longer,

75 and 10 per cent.; coach and lag screws, 80 and 15 per cent.; square h.p. nuts, blank or tapped, \$6.30 off; hexagon h.p. nuts, blank or tapped, \$7.20 off; c. p. c. and t. square nuts, blank or tapped, \$6 off; hexagon, $\frac{1}{2}$ in. and larger, \$7.20 off; 9-16 in. and smaller, \$7.80 off; semi-finished hexagon nuts, $\frac{1}{2}$ in. and larger, 85, 10 and 10 and 5 per cent.; 9-16 in. and smaller, 85, 10, 10 and 5 per cent.

Cincinnati

CINCINNATI, OHIO, April 22, 1914.—(By Wire.)

Pig Iron.—In entering the sixth week of an unprecedented dull period, the now well-worn expression of "watchful waiting" is an apt description of market conditions here as applied to both buyer and seller. Few foundries are operating at more than 50 per cent. of capacity, but the majority of them have been able to take care of iron previously contracted for, and yard stocks do not seem to be increasing to any appreciable extent. It is also stated that furnace stocks in both the South and in the Hanging Rock district are about on an even keel, with specifications on old contracts aiding materially in maintaining this equilibrium. There is so little new inquiry that one for 400 tons of Southern and Northern iron from central Indiana for last half shipment is a matter of considerable interest to the trade, being one that in ordinary times would receive scant mention. Several carload to 100-ton sales of foundry iron are reported from all offices, but in most instances special brands were involved for near-by shipment. Both basic and malleable are dull, no inquiries being out with the exception of one for 2000 tons of malleable from Detroit, mentioned last week, and not yet closed. A number of stove foundries will soon be compelled to come in the market for a last half supply, but they are not taking any interest in conditions at present. Minimum prompt shipment prices are unchanged at \$10.50, Birmingham, and \$13.50, Ironton. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton, we quote f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$14.25 to \$14.75
Southern coke, No. 2 f'dry and 2 soft.	13.75 to 14.25
Southern coke, No. 3 foundry.	13.25 to 13.75
Southern No. 4 foundry.	12.75 to 13.25
Southern gray forge.	12.25 to 12.75
Ohio silvery, 8 per cent. silicon.	17.20 to 17.70
Southern Ohio coke, No. 1.	15.70 to 16.20
Southern Ohio coke, No. 2.	14.70 to 15.20
Southern Ohio coke, No. 3.	14.45 to 14.70
Southern Ohio malleable Bessemer.	14.70 to 15.20
Basic, Northern.	14.70 to 15.20
Lake Superior charcoal.	16.25 to 17.25
Standard Southern carwheel.	27.25 to 27.75

(By Mail)

Coke.—Two southern Ohio furnace interests have contracted for their last half supply of coke with Pocahontas producers. While definite information is not available as to the price, it is understood that Connellsville quotations were met. The total of the two transactions is approximately 75,000 tons. Foundry coke is very quiet. In a number of instances shipments on contracts are being held up. The majority of foundries in this territory are not consuming anything like a normal quantity. Connellsburg furnace coke is obtainable around \$1.85 to \$2 and foundry coke at \$2.50 to \$2.75 per net ton at oven. Wise County producers ask about 10c. a ton more on both grades, but some Pocahontas brands are offered at about the same figures as Connellsburg.

Finished Material.—There appears to be no demand for railroad track material of any kind. The call for reinforcing concrete bars is also lighter than expected for the season, although building operations have been retarded both by the weather and by unrest in labor circles. Scattered orders for both black and galvanized sheets are coming in at a fairly satisfactory rate, and the outlook is said to be a trifle more encouraging. We quote No. 28 black sheets at 2.05c. to 2.10c., f.o.b. Cincinnati or Newport, Ky., and No. 28 galvanized at 3.05c. to 3.10c., the lower figures representing carload quotations. Store prices on steel bars and small structural shapes remain at 1.75c. to 1.85c., respectively.

Old Material.—With practically no exceptions, reports from dealers are not at all satisfactory as to new business. Urgent requirements are the only inducements for the foundries to make any purchases, but there is a slightly improved demand from the rolling mills. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap.	\$7.00 to \$7.50
Old iron rails.	12.00 to 12.50
Relaying rails, 50 lb. and up.	20.00 to 20.50
Rerolling steel rails.	11.00 to 11.50
Melting steel rails.	9.50 to 10.00
Old carwheels.	10.50 to 11.00

Per Net Ton	
No. 1 railroad wrought.	\$9.00 to \$9.50
Cast borings.	4.75 to 5.25
Steel turnings.	4.75 to 5.50
Railroad cast scrap.	9.50 to 10.00
No. 1 machinery cast scrap.	10.50 to 11.50
Burnt scrap.	6.25 to 7.00
Old iron axles.	17.00 to 17.50
Locomotive tires (smooth inside).	10.00 to 10.50
Pipes and flues.	6.50 to 7.00
Malleable and steel scrap.	7.50 to 8.00
Railroad tank and sheet scrap.	5.50 to 6.00

Birmingham

BIRMINGHAM, ALA., April 20, 1914.

Pig Iron.—Southern iron makers have grit their teeth and quit speculating on when the turn will come. Some idea of the absolute dearth of business in the past month and more may be gathered from the apparently authentic report that one company having six furnaces sold only 500 tons in March and another with three stacks sold only 1500 tons. The latter sold 50 tons in the first 10 days of this month and last week booked orders for 275 tons more from regular customers. From the leading interest down it is the same. There is no price dickering because there is no trading or effort to trade. An additional serious factor in the trade is the beginning of stop orders. They have begun to come in from a variety of iron consumers, showing a cutting down of foundry operations. There is no actual price basis. The leading interest and some others have an asking price of \$11, but in the absence of trading the quotation is no indication. In the disposal of 250 tons a seller got \$11 for No. 2, \$10.50 for No. 3 and \$10.25 for No. 4. Southern territory could purchase freely at \$10.75. Stocks on hand must approximate 200,000 tons, one company having 80,000 tons in its yards. The output was further curtailed the past week by accidents at two Woodward stacks. We quote, per gross ton, f.o.b. furnaces, as follows:

No. 1 foundry and soft.	\$11.00 to \$11.50
No. 2 foundry and soft.	10.50 to 11.00
No. 3 foundry.	10.00 to 10.50
No. 4 foundry.	9.75 to 10.25
Gray forge.	9.50 to 10.00
Basic.	10.25 to 10.75
Charcoal.	23.25 to 23.75

Cast-Iron Pipe.—Outside of some large contracts secured by the United States Cast Iron Pipe & Foundry Company, which will be filled at its Bessemer plant, where it has put on another pit, the big pipe trade has been quiet, but there are said to be a number of good contracts soon to be let. The demand for sanitary pipe is not so brisk as it was, dealers appearing to have stocked up. We quote, per net ton, f.o.b. pipe yards, as follows: 4-in., \$21; 6-in. and upward, \$19, with \$1 advance for gas pipe.

Old Material.—The scrap market is without feature, owing to the stagnation in iron and steel circles. Trading is light and prices are stationary. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles.	\$14.50 to \$15.00
Old steel axles.	14.50 to 15.00
Old iron rails.	13.00 to 13.50
No. 1 railroad wrought.	10.00 to 11.00
No. 2 railroad wrought.	8.50 to 9.00
No. 1 country wrought.	9.00 to 10.00
No. 2 country wrought.	8.00 to 9.00
No. 1 machinery cast.	9.50 to 10.00
No. 1 steel scrap.	9.00 to 8.50
Tram carwheels.	9.50 to 10.00
Standard carwheels.	10.50 to 11.00
Stove plate.	8.00 to 8.50

Coal and Coke.—There has been no improvement in the coal business. Many of the smaller mines are down and the larger ones are operating only from 70 to 80 per cent. Business is expected to pick up with the summer yard stocking demand. Coke continues to find a freer outlet, with some persistence in the demand from the Far West, to which freight rates have been reduced. Production is short and is taken care of. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.75 to \$3; foundry, \$3.25 to \$3.50.

St. Louis

ST. LOUIS, Mo., April 20, 1914.

Pig Iron.—Buying is scattered and in decidedly small lots, but the general character of the purchasing is such as to indicate that melting is going on continuously, while no requests of consequence are being received to hold up shipments under contracts. No pig iron is being sought for last half and no furnaces are taking business in this territory for that period, being unwilling to do so on the basis of present prices or until a more definite state of affairs is at hand.

Coke.—There has been no new business of any consequence, though consumers are taking their allotments as rapidly as they become due.

Finished Iron and Steel.—The buying in the past week has been altogether in small lots, but the demand is broadly scattered over the St. Louis territory. Warehouse buying is about 60 per cent. of normal, which is better than could ordinarily be expected, particularly with the prompt deliveries available under contract. In consequence, this is taken to mean that consumers prefer to pay a little higher prices and not be involved in contracts until there is more activity in their own market. Reinforcing bars are the only item on the list showing any vitality and in these the movement is good.

Old Material.—Such movement as there is is confined to steel and cast iron, with not enough of either to make a real market. Absolutely nothing is doing in wrought. The lists reported last week brought extremely low prices and there is considerable evidence that the railroads are not getting rid of their offerings but are being compelled to hold, the lists increasing in quantity each month. Scrap dealers are in a hopeless state of mind and quotations are nominal, it being impossible to develop business, even with a cut in prices. Nothing in sight gives any promise for the immediate future. The only list out this week is one of 3000 tons from the Burlington. We quote dealers' prices, f.o.b., St. Louis, as follows:

<i>Per Gross Ton</i>	
Old iron rails	\$10.75 to \$11.25
Old steel rails, re-rolling	10.50 to 11.00
Old steel rails, less than 3 feet	10.50 to 10.75
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	10.50 to 11.00
No. 1 railroad heavy melting steel scrap	9.75 to 10.25
Shoveling steel	8.25 to 8.75
Frogs, switches and guards cut apart	9.75 to 10.25
Bundled sheet scrap	4.50 to 5.00
<i>Per Net Ton</i>	
Iron angle bars	\$10.25 to \$10.75
Steel angle bars	8.50 to 9.00
Iron car axles	16.75 to 17.25
Steel car axles	11.75 to 12.25
Wrought arch bars and transoms	11.25 to 11.75
No. 1 railroad wrought	7.75 to 8.25
No. 2 railroad wrought	7.50 to 8.00
Railroad springs	8.75 to 9.25
Steel couplers and knuckles	8.75 to 9.25
Locomotive tires, 42 in. and over, smooth	9.00 to 9.50
No. 1 dealers' forge	7.25 to 7.75
Mixed borings	3.25 to 3.75
No. 1 busheling	7.25 to 7.75
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
No. 1 cast scrap	9.25 to 9.75
Stove plate and light cast scrap	7.75 to 8.25
Railroad malleable	7.50 to 8.00
Agricultural malleable	7.00 to 7.50
Pipes and flues	5.50 to 6.00
Railroad sheet and tank scrap	5.75 to 6.25
Railroad grate bars	6.75 to 7.25
Machine shop turnings	4.25 to 4.75

Theodore Geissmann & Co., Inc., Chicago, district sales agents for various rolling mill products, announce that after April 25 their office will be removed from 72 Adams street to 1720 McCormick Building, 332 South Michigan boulevard.

Boston

BOSTON, MASS., April 21, 1914.

Old Material.—Few transactions are recorded, and trade is about as dull as it can be. Prices are largely nominal. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$8.25 to \$8.50
Low phosphorus steel	13.75 to 14.75
Old steel axles	13.25 to 13.75
Old iron axles	21.25 to 21.75
Mixed shafting	12.75 to 13.00
No. 1 wrought and soft steel	9.00 to 9.25
Skeleton (bundled)	5.15 to 6.25
Wrought-iron pipe	7.75 to 8.00
Cotton ties (bundled)	6.00 to 6.25
No. 2 light	3.75 to 4.25
Wrought turnings	5.00 to 5.50
Cast borings	5.00 to 5.50
Machinery, cast	11.25 to 11.50
Malleable	8.00 to 8.25
Stive plate	7.75 to 8.00
Grate bars	6.25 to 6.50
Cast-iron carwheels	11.00 to 11.25

Buffalo

BUFFALO, N. Y., April 21, 1914.

Pig Iron.—Inquiry continues light. Sales for the week total a little less than 5000 tons, all grades, including one of 1500 tons of foundry and also including 200 tons of malleable sold at \$14.25 at furnace and an order of 500 tons of gray forge at \$13 at furnace. All furnaces in the district are declining to sell iron of any grade at less than \$13, f.o.b. furnace. The Wickwire Steel Company announces that it will bank its furnace Y the first week in May, or as soon as present orders are completed, and that it will remain idle for an indefinite period, depending on market conditions. We quote as follows for first half delivery, f.o.b. furnace, 25c. per ton being added for Buffalo city delivery:

No. 1 foundry	\$14.00 to \$14.25
No. 2 X foundry	13.50 to 14.00
No. 2 plain	13.25 to 13.75
No. 3 foundry	13.00 to 13.25
Gray forge	13.00
Malleable	13.75 to 14.25
Basic	13.75 to 14.25
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	20.50

Old Material.—The market continues quiet. Some sales have been made of borings and turnings for immediate delivery, but in most commodities few transactions are reported, except for inconsequential tonnages. There has been no change in prices. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$10.00 to \$10.50
Low phosphorus steel	14.50 to 15.00
Hoiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	11.00 to 11.50
No. 1 railroad and machinery cast	11.50 to 12.00
Old steel axles	13.75 to 14.25
Old iron axles	21.50 to 22.00
Old carwheels	11.50 to 12.00
Railroad malleable	10.25 to 10.75
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	15.00 to 15.50
Locomotive grate bars	9.50 to 10.00
Stove plate (net tons)	9.75 to 10.00
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.50 to 9.00
No. 2 busheling scrap	6.00 to 6.50
Bundled tin scrap	10.50

Finished Iron and Steel.—While there has been no improvement in actual tonnage placed, there has developed during the week a purpose on the part of sellers to restrict low quotations. One agency announces that it is now declining to sell bars, plates and shapes at less than 1.20c. Pittsburgh. The demand for wire and wire products is light and prices are unchanged. A large amount of fabricated structural material is being figured on for spring and summer erection. Bids went in last week for 200 tons of steel for Eddy's Men's Hotel, Buffalo. Bids go in tomorrow for the rebuilding of the Chicago street viaduct over

the New York Central and Lehigh Valley railroads, requiring about 2700 tons, also on the Palace Theater, Buffalo, 200 tons. State Engineer Benzel, Albany, is taking bids for Erie Barge Canal contract 106, which includes four lift bridges, requiring about 800 tons, and contract F, for three highway bridges over the Erie Canal, between 300 and 400 tons. Bids will soon be advertised for by J. Y. McClintock, county engineer, Rochester, for a lift bridge over the Genesee River at Charlotte, N. Y., about 1100 tons. Plans are being prepared for a large apartment building to be erected by John L. Moore at Binghamton, N. Y., to cost \$500,000, and requiring a large tonnage.

New York

NEW YORK, April 22, 1914.

Pig Iron.—In the extreme quietness of the market the few inquiries that appear get unusual attention. There are undoubtedly transactions which are not preceded by general inquiries, a good deal of pig iron being marketed from eastern Pennsylvania to purchasers who do not formally enter the market. While a good many furnaces are holding for the prices which have been named in recent weeks as those they expect to realize, there are variations from these. A recent Connecticut inquiry, for example, brought out a \$2 range in quotations. But attractive as the lowest bid might have seemed, the foundry in question postponed consideration of the bulk of the tonnage wanted, though taking two or three 100-ton lots, including some 8 per cent. silicon iron at \$16 at Hanging Rock district furnace. There are reports of quotations from Buffalo below \$13.50 at furnace for No. 2 X, prompt delivery, and \$13.25, Buffalo, is said to have been quoted on third quarter delivery. In New Jersey, out of three 500-ton inquiries reported two or three weeks ago, one has been withdrawn and one sale has resulted, possibly two. At Troy, N. Y., a recent purchase of 1500 tons was made. The Brooklyn Navy Yard will open bids on April 28 for 450 tons of coke foundry iron and 100 tons of charcoal iron and another Brooklyn inquiry is for 400 tons. In the past two days several new possibilities of business have developed locally, amounting to about 3000 tons. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$15 to \$15.25; No. 2 X, \$14.75 to \$15; No. 2 plain, \$14.50 to \$14.75; Southern iron, \$15 to \$15.50 for No. 1 and \$14.75 to \$15 for No. 2.

Ferroalloys.—Outside of the sale of a few carload lots of both ferromanganese and ferrosilicon, dullness pervades the market. Quotations for English 80 per cent. ferromanganese are about \$39, seaboard, the German product being obtainable at \$38. Fifty per cent. ferrosilicon is quoted at \$73, Pittsburgh, for carloads; \$72 for 100 tons, and \$71 for 600 tons or over.

Finished Iron and Steel.—Signs of a somewhat better feeling have appeared in some quarters of this market, but the real cause is difficult to determine. Some say that it was in evidence about a week ago and has not diminished. The opinion was expressed that it would ultimately increase and that a buying movement of more or less magnitude would eventually come, caused by actual business needs, if by nothing else. New business in plates, though in small lots, is reported to be better than for some time, and one representative of an Eastern producer states that the mill is still running at 75 to 80 per cent. of capacity. No weakness in prices in general has been detected. In structural lines new projects are few but there are reported before the market 4000 tons for the Canal street subway, bids on which are to go in about May 15; 3000 tons for a new building at Forty-fifth street and Vanderbilt avenue, and 1200 tons for 18 bridges for the Boston & Albany Railroad, bids for which are to go in April 27. While there are some 35,000 tons of various projects before the market, bids on which have gone in, only a few of these have been settled. Levering & Garrigues have been awarded the contract for the new court house at Albany, calling for 1600 tons; while the Virginia Bridge & Iron Company is to fabricate 1100 tons of bridges for the South-

ern Railway. Of the 49,000 tons of material necessary to third track the elevated systems of New York, 13,500 tons has been forwarded to the American Bridge Company. The Steel Corporation has placed orders for a total of 3500 steel cars, apportioning 1000 ore cars to the Western Steel Car & Foundry Company for the Duluth, Missabe & Northern Railroad; 1000 gondola and 250 hoppers to the Pressed Steel Car Company, 250 hoppers to the Ralston Steel Car Company and 1000 hoppers to the Standard Steel Car Company, all for the Bessemer & Lake Erie Railroad. The Pressed Steel Car Company received orders for 700 underframes from the Louisville & Nashville, which railroad also awarded 700 underframes to the Mt. Vernon Car Mfg. Company. We quote mill shipments of steel bars, plates and structural material at 1.15c. to 1.20c., Pittsburgh, or 1.31c. to 1.36c., New York, and iron bars, 1.22½c. to 1.30c., New York. It is likely that desirable orders for plates could be placed as low as 1.10c., Pittsburgh.

Cast-Iron Pipe.—The Water Board of New York City will award a contract April 27 calling for a considerable quantity of pipe, embracing sizes up to 48-in. Aside from this, no public lettings of importance have been announced. The general demand is somewhat active, but competition is so keen on all such business that the results are not satisfactory to founders. Carload lots of 6-in. are quoted at \$22 to \$23 per net ton, tidewater.

Old Material.—The volume of business the past week has been even less than that of the week preceding. About the only transactions have been purchases made by dealers, either for the purpose of covering old contracts or because offerings have been made by railroad companies at attractive prices. Consumers appear to be completely uninterested in the market, as inquiries are lacking. Rejections are still numerous and requests to postpone deliveries are unpleasantly frequent. The following quotations, per gross ton, New York, are made by dealers, but it is understood that in most cases they are nominal, as no transactions have occurred to establish prices:

Old girder and T rails for melting	\$8.00 to \$8.50
Heavy melting steel scrap	8.00 to 8.50
Relaying rails	21.50 to 22.00
Rerolling rails	10.00 to 10.50
Iron car axles	18.00 to 18.50
Steel car axles	12.00 to 12.50
No. 1 railroad wrought	10.00 to 10.50
Wrought-iron track scrap	9.00 to 9.50
No. 1 yard wrought, long	8.50 to 9.00
No. 1 yard wrought, short	8.00 to 8.50
Light iron	3.25 to 3.50
Cast borings	5.75 to 6.25
Wrought turnings	5.50 to 6.00
Wrought pipe	8.00 to 8.50
Car wheels	10.00 to 10.50
No. 1 heavy cast, broken up	10.50 to 11.00
Stove plate	7.50 to 8.00
Locomotive grate bars	6.00 to 6.50
Malleable cast	7.25 to 7.75

The Warren Foundry & Machine Company has moved its New York offices to the Bowling Green Building, 11 Broadway, New York City. It will occupy suite 1506, located on the fifteenth floor.

German Prices Still Falling

Pig-Iron Production Maintained—Cast-Iron Pipe Demoralized—Structural Material in Better Demand

BERLIN, April 9, 1914.

Weakness of prices and despondency among manufacturers continue to be the leading features of the iron trade. Beyond a moderate increase in the shipments of structural material and an increase in the production and sales of pig iron, there is nothing favorable to be reported.

The make of pig iron in March was 1,602,714 metric tons, which compares with 1,445,511 tons in February and 1,628,190 tons in March, 1913. The average daily production in March was 51,700 tons, or 75 tons more than in February, but 863 tons less than in March, 1913. For the first quarter of the

year the reduction amounted to 120,000 tons, which may be regarded as quite moderate, in view of the unfavorable trade conditions. The shipments of pig iron in March rose to 80.18 per cent. of allotments, as against 75.33 per cent. in February.

The tendency of prices is still downward. The leading newspaper of Essen says that hardly more than 94 marks (\$22.37), with 1½ per cent. discount, can now be obtained for bars, with Oberhausen as the shipping point, and that the Hoesch Company, of Dortmund, which is one of the principal producers, is offering bars for shipment to points in northern Germany at 93 marks (\$22.13), net works. It adds that the works are now able to fill orders with easy specifications within eight days, and some of them even within two or three days.

Export prices are also still falling. The Cologne Gazette quoted yesterday the following changes: Slabs, 79 marks (\$18.80), against 80 marks (\$19.04); bars, 86 marks (\$20.47), against 88 marks (\$20.94); bands, 116 marks (\$27.61), against 117 marks (\$27.85); heavy plates, 97 to 98 marks (\$23.09 to \$23.32), against 98 marks (\$23.32); rivet bars, 89 marks (\$21.18), against 90 marks (\$21.42)—all f.o.b. Antwerp. The leading newspaper of Essen, above mentioned, also says that heavy plates for export are being offered as low as 90 to 92 marks (\$21.42 to \$21.90), f.o.b. The same newspaper notes that some of the plate mills have already begun to fill orders from stock.

The best feature of the trade is the stronger position of structural material. Shipments in March rose to 195,000 tons, as compared with only 133,870 tons in February and 178,150 tons in March, 1913. Dealers have been buying considerably more freely, inasmuch as their stocks had run very low, and the building trade has moderately increased its takings. Manufacturers are still cherishing hopes that the building trade will show a more marked revival of activity this spring.

The ore market continues very quiet. Bilbao Rubio ores cost 17 to 17.25 marks (\$4.05 to \$4.11), laid down at Ruhr ports; Santander ores of first grade, 15 marks (\$3.57), and phosphoric ores from the north of Spain and France, 13 to 14 marks (\$3.09 to \$3.33).

Much attention has been attracted within a week to the state of the market in cast-iron sewage pipes. About a year and a half ago the great Gelsenkirchen Company began to produce such pipes, and it is now cutting prices so low that the foundries are complaining bitterly that it is ruining their business. At the annual meeting of the Gelsenkirchen Company last week here in Berlin, two stockholders, who are interested in foundries, sharply criticised the price cutting of the managers. They pointed out that the great advantage enjoyed by the company over the pure foundries was by no means in its superior methods of production or in a better article, but solely in the fact that it produces its own pig iron, on which it enjoys a protection of 10 marks (\$2.38) a ton. This advantage it was able to reap because the Pig Iron Syndicate maintains high prices in Germany. It was hinted by these discontented stockholders that a movement might be started for the removal of the pig-iron duty on the ground that pig iron can be produced cheaper in Germany than anywhere else in the world. In this connection it was stated that the pure foundries of Germany represent a capitalization of almost \$100,000,000. Since this discussion took place there has been a further cutting of prices. It is reported from Frankfort that they have now fallen there to 15 to 16 marks (\$3.57 to \$3.81) per metric cwt., as against 17 to 18 marks (\$4.05 to \$4.28) hitherto—these prices for 10-ton lots, and with a discount of 5 per cent. It is added that the Gelsenkirchen Company has also made lower prices, offering pipes as low as 11.50 marks (\$27.37) per ton.

In steel tubes price cutting also continues. The concerns producing seamless tubes are still pretty well supplied with orders, but those working on the welding process have fewer orders. The situation in plates remains very bad, and most of the plate mills disconnected with steel plants are being run without profit or at a loss.

A further meeting last week for prolonging the rod association was without result. The March shipments in rods amounted to 43,850 tons, against 38,755 tons in February.

The exports of certain iron and steel products in March were as follows: Pig iron, 62,555 tons, against 77,217 tons last March; semi-finished steel, 61,285 (57,821); beams, 32,500 (38,030); ordinary commercial bars, 109,720 (90,510); rails, 43,534 (41,838); ties, 13,816 (7392).

The Eisenwerk Kraft (of Prince Dönhersmarck), situated near Stettin, is increasing its capital by about \$1,000,000 to cover the cost of the steel plant and rod and wire mill that it is erecting at Duisburg (junction of the Ruhr and Rhine), and it proposes later to issue bonds to the amount of about \$3,000,000 for the same purpose.

British Trade Continues Dull

Pig Iron Weaker—Germans Making Lower Prices on Semi-Finished Steel

(By Cable)

LONDON, ENGLAND, April 22, 1914.

Everything is dull. Pig iron is weaker on easier fuel and realization, but speculation and new consumption are at a standstill. The Yorkshire coal miners have voted to resume work. Nothing is being done in semi-finished steel, but a few inquiries are being made around 75s. (\$18.25) for sheet bars, f.o.b. Antwerp, and this is about the value to-day. Germans are quietly accepting lower prices and have sold 3-in. billets at 70s. (\$17.02), f.o.b. Antwerp. Finished products remain very quiet. Tin plates are flat, but a sale of 200,000 boxes is reported for the East at 13s. 1½d. (\$3.19), f.o.b. Wales, for quarters. Stocks of pig iron in Connal's stores are 109,731 gross tons, against 113,121 tons a week ago. Active blast furnaces number 168, against 208 a year ago. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 9d. (\$3.10), against 12s. 10½d. a week ago.

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 50s. 6½d. (\$12.29), against 50s. 10½d. (\$12.37) a week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 50s. 9d. (\$12.34), against 51s. (\$12.41) a week ago.

Hematite pig iron, f.o.b. Tees, 61s. 6d. (\$14.96), against 62s. (\$15.09) a week ago.

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. (\$21.89).

Steel bars, export, f.o.b. Clyde, £6 (\$29.20).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 12s. 6d. (\$27.37).

Steel ship plates, Scotch, delivered local yards, £5 17s. 6d. (\$28.59).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 15s. (\$42.58).

Steel rails, export, f.o.b. works port, £5 12s. 6d. (\$27.37).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.:

German sheet bars, f.o.b. Antwerp, 75s. (\$18.25), against 79s. (\$19.22) a week ago.

German 2-in. billets, f.o.b. Antwerp, 73s. (\$17.75), against 75s. (\$18.25) a week ago.

German basic steel bars, f.o.b. Antwerp, £4 5s. to £4 6s. (\$20.68 to \$20.92), against £4 8s. (\$21.41) a week ago.

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. (\$24.82 to \$25.55).

Freight rates from Antwerp to New York, Boston, Philadelphia and Baltimore, per 1000 kilos (2204 lb.), are about as follows: Billets, blooms and bars, up to 20 ft., 9s. to 10s. (\$2.19 to \$2.43). Iron and steel sheets, 11s. to 12s. 6d. (\$2.68 to \$3.04). Beams up to 30 ft., 12s. 6d. (\$3.04).

Metal Market

NEW YORK, April 22, 1914.

The Week's Prices

Copper, New York	Cents Per Pound for Early Delivery		Lead		Spelter	
	Electro-	Tin,	New	St.	New	St.
April 15	Lake	14.75	14.37½	36.15	3.80	3.67½
15	Electrolytic	14.75	14.37½	36.20	3.80	3.67½
15	New York	14.75	14.37½	36.50	3.80	3.67½
15	St.	14.75	14.37½	36.60	3.80	3.70
21	Lake	14.75	14.25	35.60	3.80	3.70
21	Electrolytic	14.75	14.25	35.60	3.80	3.70
21	New York	14.75	14.25	35.60	3.80	3.70
21	St.	14.75	14.25	35.60	3.80	3.70

Copper is dull and weaker. Tin has declined under pressure to sell. Lead has been more active and is firm. Spelter is lower but buyers are not coming forward. Antimony is uninteresting.

New York

Copper.—The market has been dull, both foreign and domestic buyers showing no inclination to take copper at any figure within the present wide range of prices. The electrolytic producers are holding to the nominal price of 14.75c., 30 days, delivered, but the metal can be easily had at 14.50c., 30 days, delivered, while the general cash quotation is 14.37½c., New York, and bargains can be had at 14.25c., New York. Aside from its evident weakness there is little of interest in the market. The London quotations to-day are £64 3s. 9d. for spot and £64 for futures. Exports this month total 22,173 tons. Because of competition from both foreign and domestic mills the makers of brass and copper tubes have reduced their prices 3c. per lb. They now quote seamless brass tubes at 16c.; brass tubes, iron pipe sizes, 16c.; and copper tubes, 19½c.

Tin.—There has been a fair business throughout the week in cheap lots, most of which were taken by dealers, consumers showing no inclination to buy, low as the prices were. On Saturday sales were made at 36c. and yesterday the price was down to 35.60c. The decline here reflected weakness in London, which to-day is down to £161 for spot and £162 15s. for futures. Local dealers on Saturday evidently got some intimation of the decline which was coming on Monday in London, when there was a drop of £2. Yesterday there was a further decline in London of £3 5s. in the morning and an advance of 15s. in the afternoon, making a net loss of 22 10s. Under the circumstances there was much pressure to sell, but this eased off yesterday. The London quotation to-day is the lowest of this year. The arrivals this month total 4326 tons and there is afloat 1160 tons.

Lead.—The New York price is unchanged at 3.80c., but under the stimulus of fair buying St. Louis has advanced to 3.70c. At the latter figure some good sales have been made, including one of 300 tons in one lot.

Spelter.—The market has declined and is now weak at 5.15c., New York, and 5c., St. Louis. Offers at these figures have failed to arouse action on the part of consumers.

Antimony.—Quotations are unchanged in an uninteresting market, at 6.75c. to 6.95c. for Hallett's, 7.20c. to 7.25c. for Cookson's and 5.75c. to 6.25c. for Chinese and Hungarian grades.

Old Metals.—Business is dull. Dealers' selling prices are entirely nominal as follows:

	Cents per lb.
Copper, heavy and crucible	13.75 to 14.00
Copper, heavy and wire	13.25 to 13.50
Copper, light and bottoms	12.75 to 13.00
Brass, heavy	9.00 to 9.25
Brass, light	7.75 to 8.00
Heavy machine composition	12.25 to 12.50
Clean brass turnings	8.75 to 9.00
Composition turnings	11.25 to 11.50
Lead, heavy	3.75
Lead, tea	3.50
Zinc scrap	4.25

Chicago

APRIL 20.—The non-ferrous metal market has been unusually quiet and with respect to copper especially disappointing. The promise of better prices has now little chance of fulfilment. Quotations on tin and spelter show actual declines. We quote as follows: Cast-

ing copper, 14.50c. to 14.75c.; Lake copper, 15c., for prompt shipment; small lots, ¼c. to ½c. higher; pig tin, carloads, 36.75c.; small lots, 38.75c.; lead, desilverized, 3.75c., and corroding, 4c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.05c. to 5.10c.; Cookson's antimony, 9.50c. for cask lots; other grades, 8c.; sheet zinc, \$7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 12c.; copper bottoms, 11c.; copper clips, 11.25c.; red brass, 11.25c.; yellow brass, 8c.; lead pipe, 3.50c.; zinc, 3.50c.; pewter, No. 1, 23c.; tinfoil, 27c.; block tin pipe, 31c.

St. Louis

APRIL 20.—Lead is quoted at 3.70c.; spelter, 5.05c. to 5.07½c.; tin, 36.80c. to 37.10c.; Lake copper, 15.35c.; electrolytic, 15.10c.; Cookson's antimony, 7.60c. In the Joplin ore market the basis price was \$35 to \$39 per ton for 60 per cent., with most of the high settlements around \$42. Calamine, in some parts of the camp, sold at \$20 to \$22 for 40 per cent., with the top settlement at about \$25, but elsewhere prices were lower. Lead ore was scarcely steady, but the price for 80 per cent. at \$45. Miscellaneous scrap metals are quoted as follows: Light brass, 6.50c.; heavy yellow brass, 8c.; heavy red brass and light copper, 10c.; heavy copper and copper wire, 11c.; lead, 3.50c.; zinc, 3.50c.; tea lead, 3c.; pewter, 26c.; tinfoil, 31c.

Iron and Industrial Stocks

NEW YORK, April 22, 1914.

Security values have continued to recede, the downward movement having been accelerated by the precipitation of hostilities against the Huerta administration in Mexico. Can common fell heavily. Some improvement occurred on Tuesday. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	9 7/8 - 10 1/4	Ry. Spring, pref.	93 1/2 - 94
Allis-Chal., pref.	41 1/2 - 43	Republic, com.	21 - 22 1/2
Am. Can., com.	22 1/2 - 23 1/2	Republic, pref.	81 7/8 - 83 1/2
Am. Can., pref.	87 3/4 - 91 1/2	Rumely Co., com.	6 3/8 - 8
Am. Car & Fdy., com.	48 - 49 3/4	Rumely Co., pref.	21 - 22 1/2
Am. Loco., com.	29 - 32	Sloss, com.	26 3/4 - 27
Am. Loco., pref.	98 - 99	Sloss, pref.	89 1/2
Am. Steel Fdryes, 30	30 1/2	Pipe, com.	11 1/2 - 11 3/4
Bald. Loco., com.	46 - 48 1/2	Pipe, pref.	39 1/2 - 39 3/4
Bald. Loco., pref.	107 3/4 - 108	U. S. Steel, com.	56 7/8 - 59 1/2
Beth. Steel, com.	38 - 40 1/2	U. S. Steel, pref.	108 1/4 - 109 1/2
Beth. Steel, pref.	82 1/2 - 85	Va. I. C. & Coke	45
Colorado Fuel., 28 1/2 - 29 1/2		West'g'hse Elec.	71 1/2 - 73 1/2
General Elec., 143 - 144 1/2		Chic. Pneu. Tool	54 - 55 1/2
Gt. N. Ore Cert.	30 1/2 - 32 1/2	Cambria Steel	47 - 48 1/2
Int. Harv., com.	101 1/2 - 103 1/2	Lake Sup. Corp.	19 1/2
Int. Harv., Corp.	101	Pa. Steel, pref.	51 - 57
Lackawanna Steel	32	Cruc. Steel, com.	14 1/2 - 15
Nat. En. & St., com.	10 1/2 - 11 1/4	Cruc. Steel, pref.	90 - 91
P'gh Steel, pref.	87 - 89 1/2	Harb. Wk. Ref., com.	50
Pressed St'l, com.	40 1/2 - 42 1/2	Harb. Walk Ref., pref.	98 1/2
Pressed St'l, pref.	103 1/2 - 103 1/2	La Belle Iron, com.	35 1/2 - 37 1/2
Ry. Spring, com.	26 - 26	La Belle Iron, pref.	116 1/2

Dividends Declared

The Cambria Steel Company, regular quarterly, 1 1/4 per cent., payable May 15.

The DeWitt Wire Cloth Company, regular semi-annual, 3 per cent. on the preferred stock, payable May 1.

Announcement was made April 17 by the Pennsylvania Steel Company that it had been decided by the directors to pass the dividend on the preferred stock. The last disbursement on the issue was 2 1/2 per cent., November 1, 1913.

Henry R. Worthington, Inc., a subsidiary of the International Steam Pump Company, has passed the regular semi-annual dividend of 3 1/2 per cent. on the preferred stock. Officers state that the dividend has been earned, but that it has been deemed best to conserve cash resources at this time of depressed business.

The J. G. Brill Company, regular quarterly, 1 1/4 per cent. on the preferred stock, payable May 1.

LARGE METAL TRADES MEETING

The Worcester Gathering of the National Metal Trades Association

At the opening session of the sixteenth annual meeting of the National Metal Trades Association, at Worcester, Mass., Tuesday afternoon, April 21, the members listened to inspiring addresses on two subjects. One had to do with accident prevention, in the discussion of which M. W. Alexander, General Electric Company, West Lynn, Mass., was conspicuous; the other, with industrial education, on which Fred. A. Geier, Cincinnati Milling Machine Company, and C. A. Prosser, secretary National Society for the Promotion of Industrial Education, discoursed at length. It is interesting to add that at this first session President W. A. Layman said that "if there are doubts about the wisdom of holding the meeting in Worcester, they should be dispelled. The registration at this time numbers 212, while at the same time at last year's meeting in New York it was 211."

COOPERATION IN SAFETY MEASURES

The most interesting fact Mr. Alexander brought out had reference to the meeting held in Buffalo, N. Y., March 23 looking to the establishment of a Conference Board on Safety and Sanitation, made up of the president and one other member each of the National Founders' Association, the American Foundrymen's Association, the National Association of Manufacturers, the National Electric Light Association and the National Metal Trades Association. The Conference Board, he said, expects soon to offer to the different associations concrete resolutions covering, if possible, the one best way to handle accident prevention, accident treatment and accident insurance. He paid a tribute to the successful agreement reached through a meeting of the physicians of 15 industrial corporations on the one best method of treating given injuries. He prophesied that workmen's compensation legislation must lead to the physical examination of new employees and periodic examination of employees in service. Employers must also in self-defense apportion employees to work according to skill but also fitness for work. Because of some defect which does not impair a man's efficiency for a given job, he should not be thrown upon the street on account of the defect. As regards the safety-first movement, he deplored the fact that with many managers the effort started with safety first and ended with safety first. The sooner the manager makes this his immediate business, the sooner will he reap the benefits, both financially and ethically.

CORPORATION SCHOOLS

Mr. Geier spoke of the recent organization of the National Association of Corporation Schools. Of the 200 corporations which have provided some facilities for industrial education, 46 companies were in the organization, having upward of \$2,500,000,000 capital and 500,000 employees. He doubted if over 1 per cent. of the workers received vocational education. He advocated new types of courses for those who should receive what is called pre-vocational instruction before they go to work, adding that there should be continuation schools, and that there should be co-operative courses between groups of employers and the school system. He does not consider that schools should teach manual dexterity, but instead a type of teachers is needed who understand the vocations.

Mr. Prosser made a plea for personal appearance in Washington Friday or Saturday before the Commission on Industrial Education of those of the association who could make known the ideas of the members regarding correctives for our educational system. Emphasis was placed on the need of compulsion in industrial education, one point being that now for every \$13 worth of German machinery sold to France, only \$8 of American machinery was sent into France, a ratio taken as an index of the value of the German scheme of compulsory education, as the figures were formerly on more nearly an even basis. Mr. Prosser is in favor

of the compulsory requirement, but feels there is a place for industrial schools, for trade schools, for continuation schools and for part-time schools. He mentioned the night classes now in existence in Pratt Institute, Brooklyn, for preparing persons to teach in industrial lines, and he believes such teachers should put emphasis on safeguards. Finally he is of the opinion that the Federal government should make as much effort to care for industry in relation to the preparation of workers for it as it does, through its Department of Agriculture, for farming.

OFFICERS' REPORTS

President W. A. Layman, Wagner Electric Mfg. Co., St. Louis, Mo., was in the chair at the opening session reported above. After his introductory remarks Mayor George M. Wright of Worcester, head of the Wright Wire Company, extended a welcome to the visitors.

The reports of the officers followed: those of President W. A. Layman, Treasurer F. C. Caldwell, Commissioner John D. Hibbard and Secretary Homer D. Sayre. All told of a very successful year, financially, and in every other way. President Layman's administration is given much credit. Commissioner Hibbard's first year of office has proved him a success. The office of secretary was created in the year for Mr. Sayre, who had proved his capability during his previous connection with the association. Special consideration of the reports of the officers, also that of the safety inspector, William H. Doolittle, and that of the chairman of the committee on the prevention of industrial accidents, W. H. Van Dervoort, Root & Van Dervoort Engineering Company, East Moline, Ill., will be given in these columns next week.

VISITS TO WORCESTER SHOPS

Monday was given up to Executive Committee and Administrative Council meetings, and to visits to manufacturing plants, the Worcester Polytechnic Institute and the Worcester Trade School. In the evening the alumni dinner was held at the Hotel Bancroft, when a loving cup was presented W. A. Layman, the retiring president.

On Tuesday morning the district presidents and secretaries met with the Administrative Council, while the members visited representative Worcester manufacturing plants, including the South Works of the American Steel & Wire Company and the splendid group of works at Greendale, notably the Norton Company, Norton Grinding Company and Heald Machine Company. At noon a lunch was served the members just preceding the first general session.

CONVENTION COMMITTEES

The following committees were announced:

On Credentials: Geo. D. Babcock, H. H. Franklin Mfg. Co., Syracuse, N. Y., chairman; Franklin Farrel, Jr., Farrel Foundry and Machine Co., Ansonia, Conn.; Wilson P. Hunt, Moline Tool Company, Moline, Ill.

On Resolutions: H. N. Covell, Lidgerwood Mfg. Co., Brooklyn, N. Y., chairman; M. B. McLauthlin, Geo. T. McLauthlin Company, Boston, Mass.; D. M. Wright, Henry & Wright Mfg. Co., Hartford, Conn.; J. W. O'Leary, A. J. O'Leary & Son Company, Chicago, Ill.; A. H. Bullard, Bullard Machine Tool Company, Bridgeport, Conn.

On Constitution: A. W. Beaman, Stockbridge Machine Co., Worcester, Mass., chairman; A. E. Newton, Reed-Prentice Co., Worcester, Mass.; George M. Hendee, Hendee Mfg. Co., Springfield, Mass.

Auditing Committee: Murray Shipley, Dodge & Shipley Machine Tool Company, Cincinnati, Ohio chairman; H. B. Kennedy, Hogson & Pettis Mfg. Company, New Haven, Conn.; Geo. F. Steedman, Curtis Mfg. Company, St. Louis, Mo.

Convention Committee: Theo. O. Vilter, Vilter Mfg. Company, Milwaukee, Wis., chairman; A. J. Milne, Canadian Allis-Chalmers Company, Toronto, Ont., Can.; Paul C. DeWolf, Brown & Sharpe Mfg. Company, Providence, R. I.; Wm. Lodge, Lodge & Shipley Machine Tool Company, Cincinnati, Ohio; E. E. Bartlett, Boston, Mass.

To Make Ferromanganese at Dunbar, Pa.

The American Manganese Mfg. Company of Pittsburgh and Philadelphia, will shortly apply for a Pennsylvania charter with a nominal capital, which it is said will be increased later to \$12,000,000. The company proposes to manufacture ferromanganese. In it are to be merged the Cuyuna Mille Lacs Iron Company and the Duluth Iron Company of Duluth, Minn., and the Dunbar Furnace Company, Dunbar, Pa., including its allied coal and coke interests. The two Duluth companies, which own manganeseiferous iron ore deposits on the Cuyuna range, have already assented to the merger. It is stated that a 60 per cent. ferromanganese will be produced from these ores and imported manganese ores at the Dunbar furnaces, which have been idle for a number of years. Adjoining them are 110 Semet-Solvay coke ovens and near by are coal properties. William Selfridge, trustee in bankruptcy for the Dunbar Furnace Company, has sent a letter to its creditors, urging that they take stock in the new concern in payment for their claims against the Dunbar Furnace Company. Responses are now being awaited to these letters, and it is said that if they are favorable the plans will be carried out.

Dismantling a Hokendauqua Furnace

No. 5 blast furnace of the Thomas Iron Company at Hokendauqua, Pa., is being dismantled this week and has already been taken out of the list of active furnaces. It was 17 by 60 ft. by 11 ft. hearth and was built in 1873. The last iron was made March 26, 1910. The stack was run mostly on anthracite although some coke was used in some of the later blasts. It had a total of 11 blasts and made a total of 370,517 tons of pig iron. The hearth jacket and parts of the hot blast connections will be used to help rebuild the company's No. 8 furnace at Alburtis, Pa. The Thomas Iron Company now has eight furnaces on its list, but only six of these are considered available as producers.

Alabama Consolidation Rumors

Reports of a proposed merger of various iron producing companies in the Birmingham district have appeared recently. One of these refers to four companies in the Alabama district which might in time be consolidated. Definite mention is made in Birmingham papers of a proposal to bring together the Gulf States Steel Company and the Sloss-Sheffield Steel & Iron Company. A recent visit of representatives of New York interests to the Birmingham district seems to have given rise to this last report, but beyond the statement that consideration had been given in some quarters to the merger of the two companies, no one in interest has paid any attention to the rumors.

A special committee of directors of the International Steam Pump Company is working on a plan for a merger of controlled companies with the parent concern which will make the International a producing rather than a holding company. Measures looking toward the unification of the operating departments of the various properties involve an exchange of International stock for outstanding shares of the companies whose stock is not already held in the central organization's treasury. The company has a dominant interest in about 15 manufacturing concerns in this country and Europe.

J. L. Osgood, 121 Erie County Bank Building, Buffalo, N. Y., has leased the six-story building at 43 and 45 Pearl street, in that city, and will occupy it May 1. This change will increase his facilities for handling a line of machinery, tools and shop equipment.

The firm of Duncan & Duncan, patent lawyers, has been dissolved, and Frederick S. Duncan is to continue to practice at the Cockcroft Building, 73 Nassau Street, and Harry L. Duncan, at the Liberty Tower, 55 Liberty Street, New York.

Option on Pennsylvania Steel Company

It is understood that W. H. Donner, president of the Cambria Steel Company, has taken an option on the Pennsylvania Railroad Company's stock holdings in the Pennsylvania Steel Company, representing considerably more than a controlling interest, and that an examination of the properties of the latter company and the connected Maryland Steel Company is now under way. The outcome may be the acquirement of the Pennsylvania Steel Company and the Maryland Steel Company with a view to their consolidation with the Cambria Steel Company in which the largest holdings apart from the Pennsylvania Railroad Company stock are now those of the Donner and Frick interests.

Foote Brothers Enlarge Gear Plant

Owing to the increasing demand for large heavy cut gears, which are displacing cast tooth gears, the Foote Brothers Gear & Machine Company, 210-220 North Carpenter street, Chicago, Ill., has installed in its plant a very large automatic gear cutter, built specially by Gould & Eberhardt, Newark, N. J. This machine is arranged to cut special gears and hob worm gears up to 150 in. diameter, 20-in. face and 6-in. circular pitch. It has also increased its hobbing department, to take care of helical and spiral cut gears up to 40 in. in diameter. The automatic screw machine department has been expanded by the addition of several large machines and can now handle bar work up to 4½ in. in diameter. A generator will shortly be installed for cutting spiral tooth bevel gears up to 18 in. in diameter. More space being required for the large equipment of modern tools recently added, the company is now laying out 10,000 sq. ft. more of floor room for its machine shop. It will then be better prepared to handle its steadily growing gear business.

The Diamond State Steel Plant

A press dispatch from Wilmington, Del., states that the plant of the defunct Diamond State Steel Company is to be remodeled and within a few months will be manufacturing merchant bar iron. After this portion of the plant is in operation, attention will be given to steel making. The property was recently sold by the trustees to Daniel J. Driscoll, and it is stated that Howard T. Wallace, former president of the old company, will be associated with him in the new company to be formed to operate the works. It is further stated, however, that Stevenson & Co., Philadelphia, may appeal to the Delaware Supreme Court to have the sale of the plant set aside on the ground that it was not conducted in accordance with the decree of the court having jurisdiction of the matter. Stevenson & Co. claim that their bid of \$209,000 for the entire plant was the highest offered, but the trustees, who claimed that the bid was not offered at the proper time, refused to consider it.

Rogers, Brown & Co. are continuing to import high-phosphorus Nova Scotia pig iron. Their first cargo was shipped from Sydney, N. S., by the Dominion Iron & Steel Company, the first week in April and discharged at Philadelphia about two weeks ago. Two more steamers carrying cargoes of pig iron will sail from Sydney this week—one for Bridgeport, Conn., and one for Philadelphia—and this iron will be imported by the firm in large quantities hereafter.

Ridgeway & Welch, 1112 First National Bank Building, Cincinnati, Ohio, is a partnership recently formed to deal in finished iron and steel products. William P. Ridgeway and George W. Welch compose the new firm.

The Baldwin Locomotive Works has received an order for 40 Mallet engines from the Norfolk & Western Railway.

PERSONAL

President James A. Farrell, of the United States Steel Corporation, sailed for Europe April 21 on the Lusitania. It is Mr. Farrell's first vacation trip since he became president of the Steel Corporation. He will reach New York on his return on Thursday, May 21, the day preceding the meeting of the American Iron and Steel Institute.

F. C. Smink, president Reading Iron Company, Reading, Pa., sailed for Europe on Tuesday, April 21, by the Lusitania.

Herbert H. Rice, of the Waverley Company, Indianapolis, Ind., manufacturer of pleasure and commercial electric automobiles, was elected president of the National Metal Trades Association, at its annual meeting held at Worcester, Mass., Tuesday and Wednesday. He became identified with the automobile business through the bicycle industry, joining the sales force of the Pope Mfg. Company, in Boston, 22 years ago. He remained with that company until about five years ago when the Waverley Company was organized out of what had been the Indianapolis branch of the Pope Company. From Boston he went for the Pope organization to Hartford and Providence and finally to Indianapolis, 10 years ago. He is a native of Providence, R. I., and was graduated from Brown University.

William Disston president, Edmund B. Roberts first vice-president, William D. Disston second vice-president, and Hamilton Disston treasurer, are the officers elected by the board of directors of Henry Disston & Sons, Inc., at a meeting held at Philadelphia, April 13.

Frank Gould, on April 20, severed his connection with Henry Disston & Sons, Inc., Philadelphia. For some time he has been sales manager of the hardware department.

Arthur G. McKee, Cleveland, engineer and general contractor for power plants and coal storage and equipment, has opened a branch office at 52 Broadway, New York, in charge of P. N. Stewart.

H. P. Parrock, manager of the Lumen Bearing Company, Buffalo, N. Y., has completely recovered from his recent illness.

Frederick B. Cook, who for several years has been director and vice-president of the Safety Scaffolding Company, New York and Atlanta, has resigned from that company and has assumed the vice-presidency and management of the American Mailing Device Corporation, 103 Park avenue, New York, of which I. Townsend Burden, Burden Iron Company, Troy, N. Y., is president.

Frederick T. Connor, formerly with the Joliet Railway Supply Company, has resigned to become Western railroad sales agent for the Carbon Steel Company, with offices at 819 Railway Exchange Building, Chicago.

W. H. Baltzell, formerly in the engineering department of the Pittsburgh Crucible Steel Company, Midland, Pa., has accepted a position as consulting engineer for the Pennsylvania Steel Company, Steelton, Pa.

Elliott H. Whitlock, who recently resigned from the National Carbon Company, as factory manager, has established himself as a consulting engineer and carbon expert at 1506 West 112th street, Cleveland, Ohio. He plans to devote himself also to efficiency management, for which he is equipped with eighteen years experience in the carbon industry and in the management of plants in other lines.

A. W. Zahniser, who for the past seven years has been connected with the Carnegie Steel Company's Waverly warehouse at Newark, N. J., has accepted a position with the Guerber Engineering Company, Bethlehem, Pa. Mr. Zahniser will be engaged in sales and contract work in general structural steel lines as well as in railroad, frog, switch and special track work.

G. M. Skiles, president of the Ohio Seamless Tube

Company, Shelby, Ohio, returned April 15 from a three months' trip to Europe.

On the evening of April 14 a dinner was given at Sherry's, New York City, by the copper producers of North America to Charles F. Brooker, president American Brass Company, to celebrate and commemorate his 50 years' connection with the copper industry. The Engineering and Mining Journal states that it was the most representative gathering of men in the copper industry which ever came together in this city. John D. Ryan, president Amalgamated Copper Company, acted as toastmaster and helped to enliven the evening by his witty remarks. He stated that the concern of which Mr. Brooker is the head had purchased during the past 50 years 2,500,000,000 lb. of copper. A bronze piece was presented to Mr. Brooker as a testimonial and he responded with an address in which he paid tribute to the founders of the industry of which he is now president.

Ex-Rear Admiral Francis T. Bowles resigned the presidency of the Fore River Shipbuilding Corporation at the annual meeting held at Quincy, Mass., April 17.

Thomas J. Bray, Youngstown, Ohio, president of the Republic Iron & Steel Company, was elected a member of the executive committee at a meeting of the directors held last week.

A. S. Baldwin has accepted the position of manager of works of the Best Mfg. Company, Pittsburgh. On April 1 Mr. Baldwin resigned as general manager of the Alberger Pump & Condenser Company, Newburgh, N. Y. Previous to this last connection he was general superintendent of the Driggs-Seabury Ordnance Corporation, Sharon, Pa.

C. E. Ogden, 515 Mercantile Library Building, Cincinnati, Ohio, has been appointed Cincinnati representative of the Automatic Transportation Company, Buffalo, N. Y., manufacturer of electric trucks for use in foundries and machine shops.

G. H. Charls, a prominent importer of Valparaiso, Chile, accompanied by Thornton N. Motley, a New York exporter, visited a number of machine tool and other manufacturing plants in Cincinnati, Ohio, last week.

Frederic L. Bosworth, 110 West Thirty-fourth street, New York, has incorporated his general machinery business under the name of the Engineering & Machinery Corporation, to take care of increasing trade, and in addition has secured the United States rights to the Turner system of baffle walls for water-tube boilers. By this patented system, firebrick of a special shape is used for the construction of the wall, and the various members are tied into a flexible mass by the use of soft cores, the purpose being to construct a wall crossing the tubes tight and strong enough to deflect the burning gases in the desired direction and to be durable. It is offered to users of water-tube boilers as a tight, durable and satisfactory repair for baffle walls, costing less per horsepower than the old plan of repair, wherein a brick of a fixed contour was manipulated to fit a space of unknown shape and size, without hope of a gas-tight wall. By the Turner system a defective tube may be withdrawn, and a new one put in place, leaving the wall in perfect condition, as the tubes are free in the wall and there are no loose bricks to fall out.

The Follansbee Brothers Company, Pittsburgh, with plant at Follansbee, W. Va., will add three hot sheet mills, giving a total of seven sheet mills and six tin mills. The company will also increase very materially its warehouse facilities, adding two brick buildings, each 60 x 120 ft. At present it does not make galvanized sheets, but contemplates a galvanizing department later. Some enlargements are also being made to the power equipment, a turbine and other equipment being added.

The business of Harold McCalla, dealer in iron and steel, 444 Fairmount avenue, Philadelphia, has been incorporated as the Harold McCalla Company.

Pittsburgh and Nearby Districts

The annual meeting of the Carbon Limestone Company was held at Youngstown, Ohio, April 16, and elected directors as follows: Mrs. Edith Andrew Logan, Robert Bentley, Mary S. Logan, James A. Campbell and John A. Logan. The board elected Robert Bentley, president; John A. Logan, vice-president, and Mary S. Logan, secretary and treasurer. Reports presented at the meeting showed that in the past year \$120,000 had been expended in improving the property by the installation of a high-grade crushing plant, electrically operated, with accessory equipment. Power is secured from the Mahoning Valley Traction Company's station at Lowellville. The Carbon Limestone Company has 1100 acres and a capacity of producing 1,500,000 tons of crushed stone each year. The property is near Lowellville in the Hillsdale, Pa., district.

At the April meeting of the Engineers' Society of Western Pennsylvania, Henry W. Oliver Building, Pittsburgh, Carl Nibeker, steam engineer for the Youngstown Sheet & Tube Company, Youngstown, Ohio, presented a paper on "Tests of a Large Reversing Engine and Rolling Mill."

The Standard Sanitary Mfg. Company, Pittsburgh, has taken out a building permit for a three-story foundry and two-story brick machine shop to be erected adjacent to its present plant on Preble avenue.

The McKinney Mfg. Company, Pittsburgh, manufacturer of hinges, barn-door hangers and other specialties, has taken out a building permit for a six-story brick and steel warehouse to be located on Liverpool street, adjoining its present plant.

The Pittsburgh Coal Company, Pittsburgh, has issued orders that hereafter its mine foremen, assistant foremen, fire bosses, machine foremen and drivers must sever their connection with all clubs which have side-board attachments. Failure to comply will mean dismissal.

The annual meeting of the Amalgamated Association of Iron, Steel and Tin Workers will be held in Columbus, Ohio, commencing May 5. After the routine business and the election of officers have been disposed of, the wage scale for puddling and bar-iron mills for the year commencing July 1 will be taken up.

Wickes Brothers, Saginaw, Mich., manufacturers of boilers and dealers in machinery, have discontinued their Pittsburgh office, and in the future will maintain an office and yard at Thirty-ninth street and Lowe avenue, Chicago.

The Topliff-Ely Company, Washington, Pa., manufacturer of toy vehicles, is building an addition to its factory, 40 x 300 ft.

Veeder Heasley, service director, Youngstown, Ohio, will shortly advertise for bids for a pumping station.

The Allis-Chalmers Mfg. Company reports for its first fiscal period ended with December 31, 1913, net profits of \$755,124, after charging \$473,747 to operating and maintenance expenses. The report covers eight and a half months. At the close of the period unfilled orders on hand amounted to \$3,358,684. Gross sales aggregated \$11,127,621. President Falk told the stockholders that the board of directors had considered the question of declaring a dividend on the preferred stock, but concluded to defer action until such time as current profits and future prospects would justify a reasonable assurance of a continuance of dividend payments.

The Fitzsimons Company, Youngstown, Ohio, manufacturer of polished shafting and special shapes, has established an office at 1118 Chestnut street, Philadelphia, in charge of John W. Moon.

The Massillon Rolling Mill Company, Massillon, Ohio, has placed a contract with the S. R. Smythe Company, Pittsburgh, for three furnaces to be erected in its open-hearth steel plant.

Fatigue and the Modern Business Man

In the course of an address made before the Western Efficiency Society, on February 27, in discussing the problem of human efficiency with special reference to the industries, Herbert L. Trube, Indestructo Company, Mishawaka, Ind., made the following observations on the subject of fatigue:

Those conditions which hinder attention have the direct effect of decreasing the product of labor. Both the feelings of monotony and fatigue are two such conditions, and, therefore, for high efficiency should be avoided. Primarily, fatigue is due to continued application to an activity without adequate relaxation. Secondly, it results from the conscious or unconscious effort expended in overcoming distractions. I believe the greater part of the fatigue which is developed in our factories and offices is due to the fact that in striving to give full attention to the work in hand the individual wastes his much needed energy in resisting interferences.

The modern business man is exhausted no more by his actual achievements than by the things which he is compelled to resist doing. Appeals for his attention are ceaseless. The roar of the street, the ring of the telephone, the din of typewriters, the sight of a row of men waiting for an interview, the audible conferences of neighboring office men, the plan for the day's work which is delayed, the anxiety for the results of certain endeavors, suspicion as to the loyalty of employees—these and a score of other distractions are constantly bombarding him.

In a similar way the workman in the shop resists the distractions of unnecessary noises, unnecessary conversations, unnecessary sights, etc. Walter Dill Scott, professor of psychology Northwestern University, says in substance, "As any source of light gives off equally in all directions, so the human intellect seems designed to absorb from all directions." To prevent waste of energy, therefore, all possible distractions should be removed, thus leaving the mind free to concentrate on the work in hand.

Sheet Metal Trade Convention

Arrangements for the entertainment of the National Association of Sheet Metal Contractors, whose annual convention will be held in Cincinnati, Ohio, June 16 to 19, were rounded out at a meeting of the Cincinnati Sheet Metal Club on April 16. In addition to the usual banquet, the delegates and their friends will be invited to a beefsteak fry as guests of the Newport Rolling Mill Company. On the following day a special train will convey the party to the plant of the American Rolling Mill Company, at Middletown, Ohio. The business programme of the association includes a number of discussions, the most important being on "The Cost of Doing Business." James A. Daugherty is president and Edwin L. Seabrook is secretary. The Hotel Gibson has been selected as official headquarters, and the exhibits and business meetings will be held at Music Hall, Twelfth and Elm streets.

Pig Iron Meeting in New York

The American Pig Iron Association will hold its first general meeting in New York at the Waldorf-Astoria, Thursday, April 23. There will be a banquet in the evening, presided over by Joseph G. Butler, Jr., Youngstown. Since the organization of the association, several months ago, meetings have been held in the seven districts into which the country is divided.

Co-operation vs Unrestrained Competition*

The Establishment of Uniform Policies Through Organization in the Various Branches of Industry the Remedy for Present-Day Ills

BY WILLIAM C. COFFIN†

"We must have competition so that the price will be right!" This demand measures the depth of the rut in which the public mind travels in accepting tradition instead of investigating the subject. The right price can only be arrived at in one way and that is by knowing the actual cost and adding a reasonable profit. It is criminal to sell below the cost line and it is foolish to add more than a reasonable profit.

The best way to kill a demand for goods is to ask too much, just as the best way to kill a business is to ask too little. There is always the middle ground upon which a safe and sane business policy can be established and maintained. There is a form of competition that is natural and right. This is the competition of brains, of ideas and of invention, and this competition is the safety valve that keeps a natural or real price where it should be, that is, as low as cost plus a reasonable profit can put it. In other words it will never do to use old-fashioned methods that make the cost too high, nor to be satisfied not to be always alert to reduce the cost wherever possible, and to give the consumer a proportionate benefit, for it is the right, the privilege and the duty of every producer to compete in cost, and the one who reaches the lowest cost line can keep a higher percentage of profit as a fair return for his effort and genius.

In every line of trade, in every profession, in agriculture and in labor, national organizations have been formed in order that there may be co-operation in each sphere of human activity. In this direction lies the cure for the ills that have beset us in the marvelous development of commerce and trade in recent years. There are three primal elements in production and trade:

1. Producing at the lowest cost.
2. Trading at a reasonable profit.
3. Trading being governed by the law of supply and demand.

With these principles recognized, the co-operation of all the units of any trade will only tend to improve all the conditions both to the producer and to the consumer. If a law can be enacted demanding the recognition of these elements and acknowledging the necessity of co-operation, a new era for commerce and trade, built upon a true foundation, will begin and the whole people will feel the benefits from the very start.

And right here it may be said that had such principles been in vogue during the last quarter of a century there would never have been the call for the creation of the huge combinations in business that are recognized as overgrown, as too large and unwieldy for management and all too likely to infringe in some departments at least on the basic elements of human rights. These combinations were formed because co-operation did not exist and the less strong were glad to unite with or sell out to the stronger rather than face the destruction that competitive methods made certain.

The Government has forced a separation of the units in several of these combinations; but either

there must be co-operation among these units—and no one doubts that there is—or the return to the old methods will leave them in the same dangerous position that they were in when they were forced to combine.

Is it not infinitely better to recognize and legalize a proper degree of co-operation rather than force the most brilliant business and legal minds of the country to devise subterfuges to evade the law and of necessity to incorporate into the co-operation thus secured secret understandings and other connecting influences which it is the very purpose of law and reason to try to prevent?

A SCHEME FOR TRADE ASSOCIATIONS

In what direction should this new law point or how can it be framed in simple terms?

1. Let all the trade associations that have interstate affiliations be recognized by the National Government and be required to register in the Department of Commerce, with a statement of the object, the membership, the home office and the roster of officials of each association.

2. Require that all actions of each association shall be recorded in a minute book which shall at all times be open to the inspection of the members of the association, and to the authorized agents of the Departments of Commerce and of Justice.

3. Make the discovery of any clique or pool or private agreement of any members of an association subject to very drastic punishment by imprisonment.

These simple rules pretty well cover all that the Government need require excepting that starting off from the old viewpoint into a simplified natural method, some of the old tricks from the competitive basis may need to be safeguarded against for a time; and also due to the great territory embraced in our country and the difference in interests in the several localities it may be advisable to permit of sectional associations. The country could be divided into eastern, central, western and southern sections, from each of which associations may be recognized and each association could determine whether or not business interests from other sections could be represented.

Where or when in the judgment of the Secretary of Commerce there seem to be too many associations of the same trade, the department should be authorized to require a consolidation of several associations.

The law could also limit the representation in any association of different individuals, firms or corporations, when shown that they were dominated by the same interests.

If the law will protect the people from the evils of the old system it can safely trust the representatives of commerce and industry to do the right thing; for as long as the representatives really represent the feeling and desires of the whole community of interests, so long will the policies established by the association be fair and honest.

The great mass of all the people are honestly inclined, and the great mass of business men are made up from the more intelligent element of the people and it has never been intimated, nor ever

*From an article in American Industries for April, 1914.
†Structural engineer, Jones & Laughlin Steel Company, Pittsburgh.

need be, that the sentiment of the majority is not a true sentiment, when referring to the appointed and elected heads of business interests.

CO-OPERATION TENDS TO FAIRNESS

The competitive system put a premium on shrewd tricks of the trade, but the co-operative system will have the majority always on the lookout to keep the trickster within the law, to expose any attempt to form pools or cliques, and to keep out of the control of the associations those who are inclined to use unfair methods. On the other hand the associations will be an educating factor to demonstrate to the worker of tricks and shams that "honesty is the best policy."

No individual, firm or corporation should be required to join an association, but if any stay out it would become a sign both to the Government agents and to the members of the association either that they do not appreciate the advantage of co-operation or that they want to try to take some undue or illegal advantage of it.

Doubtless every business man who belongs, or has belonged, to a national organization will admit of the advantages gained by co-operation, and yet many of these associations have had elements of weakness that when eliminated will make them of much greater usefulness.

Frequently there has been a lack of publicity and a fearfulness of recording the actions taken, also and from these very causes a faction or clique has had a dominating influence; but these are all borrowed from the old competitive system where each factor worked secretly for the undoing of his brother tradesman. When these methods are all abolished in favor of a proper degree of publicity, a complete record of actions taken and activities followed, and a representative hearing given to each member, then the necessity of Government intervention will rapidly diminish and soon die out completely for when any member needs correction the association will act on his case, and if the offense is serious will see that proper punishment is inflicted.

UNIFORM POLICIES DESIRABLE

The chief purpose of the national associations would be to establish a uniform policy in the operation of each of the several trades, to change chaos to order by the assimilation of individual and conflicting systems of trade, weeding out what is wrong in any and giving to all the benefits of what is best in those that are more advanced than others.

There are many secondary purposes that can be accomplished tending to simplify methods and to increase the efficiency of the different departments such as traffic, sales, advertising, credit, etc. Many smaller business houses do not know how or cannot afford to investigate efficiency methods or run a credit bureau or a traffic department. The associations can furnish much helpful data along these and similar lines that will more than reimburse the members for whatever dues they pay in maintaining the association.

The statistics of a reliable character obtained will be invaluable not only to the members of the association but to the Government also, and gradually production and consumption will be attuned to each other without any agreements in restraint of trade being necessary, and prices will also be better averaged, doing away with violent fluctuations that are always a menace both to the producer and consumer. Existing laws need not be revoked nor amended until public sentiment, as molded by these associations, may demand a change.

The railroads have been operating along similar lines ever since the Interstate Commerce Commission was established. They have their traffic associations without which inter-exchange of business would be almost a farce, and rates are fixed by tariff associations, subject only to the approval of the commission. This indicates that staple articles of many sorts could have settled prices subject to Government approval that would be a boon to all concerned.

The railroads have also their Master Car Builders, Engineering, Motive Power, and many other associations, all of which have helped in systematizing the entire railroad equipment and method of operation and everything that they have done in this direction could helpfully be duplicated in principle by other lines of commerce and industry to the end that the human family shall work out its destiny in trade not as units full of dissension but as an intelligent co-operating force working unitedly for the good of all mankind.

This monograph offers only a suggestion along the lines of remedial legislation and it obviously is not intended to be a complete outline of the proposition. However, if Government regulation of big business is ever going to come, will it not be necessary that it should take some such form as suggested?

It must be clear that an army of detectives and another of expert accountants would be required to enforce, in an incomplete way, any governmental regulation of individual business institutions; but if the agents of the Government can work through trades associations, the whole problem will be greatly simplified, not only by the considerable reduction in numerical factors, but they will be dealing with uniform policies as against a chaotic mass of varying manners and methods if it were otherwise practical to reach the thousands of individuals, firms and corporations that make up the business and commercial forces of the nation.

The Government will of course be free to prosecute any individual violators of law, but as has been pointed out, the associations will be of great assistance to the agents of the Government when such cases exist; while as educating factors to keep all the operations of commerce and trade well within the law their value to the whole people will be infinitely greater.

Spark Test for Distinguishing Steel

The spark test of selecting steel is used by John F. Keller, instructor in forging, Purdue University, Lafayette, Ind. It will be recalled that by the color and general appearance of sparks the attempt is made to ascertain something of the composition of the steel. Mr. Keller has an 18 x 24-in. chart for use in this connection, giving the colors to be expected with certain contents of the steel and a general idea of the appearance of the sparks. He does not advocate the method over analytic determinations, but from 30 years' experience feels that it has utility in speed and accuracy over the crude methods commonly used in forge shops or toolrooms, when one desires to differentiate iron, mild steel, tool steel, high speed steel, old-time Musket steel, magnet steel, etc.

The annual report of James Cunningham, state labor commissioner, issued April 10, shows that 243 new factories have been added to Detroit's industries in the past year, making a total of 2684 factories, as compared with 2441 in 1912.

The United Steel Company, Canton, Ohio, has placed a contract for the installation of a 6-ton Heroult electric furnace. It is expected to be ready for operation by August 1.

OBITUARY

EMIL GERBER, identified with the construction of many of the largest bridges in the United States, died at his home in Pittsburgh April 16, aged 56 years. He was born at Reichenbach, Saxony, Germany, and was graduated from the Worcester Polytechnic Institute, Worcester, Mass., in 1876. After a short experience in teaching he engaged in railroad engineering in the West. As resident engineer, he had charge of construction of the Blair Bridge, Missouri Valley, Iowa; the Sioux City Bridge, Sioux City, Iowa, and Jacksonville Bridge at Jacksonville, Fla., all of which were designed by the late George S. Morison. In 1889 he was made principal assistant engineer to Mr. Morison, resigning in 1897 to accept the position of chief engineer of the Lassig Bridge & Iron Works, Chicago. He was manager of the Lassig plant during the years 1900 and 1901 and was then appointed assistant to the president of the American Bridge Company at Pittsburgh, also serving as operating manager of the Pittsburgh division of the American Bridge Company from 1905 to 1911. In 1911, in addition to his duties as assistant to the president, Mr. Gerber assumed duties of the general manager of the erecting department. During the years 1910 and 1911 the construction of the Gary plant of the American Bridge Company was under his direction. He was a director of the American Society of Civil Engineers, and a member of the American Railway Engineering Association, American Iron and Steel Institute, Western Society of Engineers, Engineers' Society of Western Pennsylvania, Chicago Engineers' Club, and Duquesne Club, Pittsburgh. He leaves a widow, a daughter and a son.

ALFRED NOBLE, one of the most eminent engineers in this country, chief engineer of the Pennsylvania Tunnel & Terminal Railroad Company and a former president of the American Society of Civil Engineers, died April 19, at St. Luke's Hospital, New York City, aged 70 years. He was born in Michigan, and served for three years in the Army of the Potomac. He received the degree of civil engineer in 1870, and for the next 12 years was in charge of improvements in the St. Mary's Falls Canal and St. Mary's River. From 1883 to 1886 he was general assistant engineer of the Northern Pacific Railroad, and for some years after that was in charge of the construction of railroad bridges in various parts of the country. He was a member of the Nicaragua Canal Board in 1895, of the United States Board of Engineers on Deep Waterways in 1899 and 1900 of the Isthmian Canal Commission from 1899 to 1903, and of the board of consulting engineers of the Panama Canal in 1905. In May, 1912, Mr. Noble received the Elliott Cresson medal from the Franklin Institute, Philadelphia, in recognition of his work. He leaves a widow and a son.

CHARLES BAILEY, president Reliance Steel Casting Company, Pittsburgh, and one of the oldest steel-casting manufacturers in this country, died at his home in Oakmont, Pa., April 20, from pneumonia. He leaves a widow, two daughters and two sons.

The steamer W. D. Crawford, being built for the Virginia Steamship Company at the American Shipbuilding Company's yards in Lorain, Ohio, was launched April 18. It is almost a duplicate of the Robert L. Ireland, launched a few weeks ago, being of the Isherwood type, 524 ft. overall, 54 ft. beam and 30 ft. deep. It will carry 9000 gross tons. An important feature of the construction of this boat is that the hatches are 12 ft. wide, with 24-ft. centers. The general practice has been, recently, to build lake freighters with 9-ft. hatches on 12-ft. centers. The Crawford is the first boat of the Isherwood type to have the number of hatches cut in half, the purpose being to make the boat stronger and to provide more deck room. It will take the place of the Isaac M. Scott, lost in the great storm last November, and will be managed by M. A. Hanna & Co. It is named in honor of the president of the La Belle Iron Works.

A Tribute to Joseph S. Seaman

Several hundred of the business friends and associates of Joseph Sidney Seaman, president of Seaman-Sleeth Company, operating Phoenix Roll Works, Pittsburgh, made his seventy-fifth birthday on April 14 an occasion for expressing in various ways their respect and admiration for this pioneer of Pittsburgh in connection with a reception at the home of his daughter. The heads of practically all the steel companies in Pittsburgh were in attendance, with representatives of other financial and business interests and the occasion was a memorable one. Business friends from Chicago, Cleveland, Cincinnati, Philadelphia, New York and the New England States also came, and the house was banked with floral reminders from many who could not be present. Among other remembrances was a loving cup, representing the good wishes of members of the Roll Association. Mr. Seaman gave the 220 employees of the Phoenix plant a holiday and presented each man with a check for a week's pay. The employees gave Mr. Seaman an engrossed memorial expressing good wishes. This was signed by all and the length of service of each was indicated.

Mr. Seaman, as he has been one of the longest in service among the well-known men in the iron and steel industry of the Pittsburgh district, is also one of the most beloved. From the superintendency of the old Black Diamond mill, which he helped to build in 1869, he went into business for himself, being associated with the old firm of Bellman & Bagley. In 1895 it was incorporated as the Seaman-Sleeth Company, of which he has always been president. He was one of the first presidents of the American Foundrymen's Association and of the Pittsburgh Foundrymen's Association, and has always taken an active part in the work of both. He was largely instrumental in establishing the school for apprentices at Carnegie Technical Schools. Mr. Seaman is a director of the Superior Steel Company, of Pittsburgh, and president of the Bank of Western Pennsylvania. He was born at Harmony, Pa., near Pittsburgh, April 14, 1839.

Copper in Roofing Sheet Steel

Copper-bearing steel was the subject of a lecture by D. M. Buck, chief chemist of the American Sheet & Tin Plate Company, Pittsburgh, delivered on the thirteenth floor of the Hudson Terminal Building, 30 Church street, New York, Monday evening, April 20. In response to invitations and announcements about 100 were present from the metropolitan district and they gave the speaker an interested hearing. The speaker discussed the general subject of corrosion and also various criticisms of copper-bearing steel that have appeared. While the lecture embodied much that was contained in Mr. Buck's paper published in *The Iron Age*, April 17, 1913, several new photographs were thrown on a screen, giving views of the various test stations and showing the condition of the plates to a quite recent date. In all cases the copper-bearing material was shown to be in good condition, while all non-copper plates had wasted away. The speaker answered numerous questions which brought out interesting points.

The newly formed Chicago Section of the American Institute of Mining Engineers held its first annual meeting and dinner at the Sherman House on the evening of April 14. The officers elected were Robert W. Hunt, chairman; J. C. Ede, vice-chairman; H. W. Nichols, secretary-treasurer, and on the executive committee, F. K. Copeland and G. M. Davidson. The next meeting will be in May.

The application of the locomotive crane to modern industries is the subject of an illustrated paper which is to be delivered by Alexander C. Brown, vice-president Brown Hoisting Machinery Company, Cleveland, Ohio, before a meeting of the Cleveland Engineering Society, on the evening of April 28.

The Machinery Markets

The dullness of the machinery markets is complete and country-wide. It seems to have reached a stationary low level. Buying is practically at a standstill, especially in the East and the Ohio Valley. Inquiry, however, is increasing; but whether permanently or not cannot be foretold. Business in Cincinnati is sustained by a moderate local trade. Inquiry lags and apprehension is felt over rumored labor troubles in the building trades due May 1. Much prospective business in Cleveland has been held up and business marks time. Both these cities report foundries working on about 50 per cent. capacity. The Detroit market is very quiet. As one merchant stated it: "While there is a great deal of optimism, there is little actual business." Conditions in Chicago are much better than elsewhere; and taking into consideration the importance of this buying center, it is correspondingly encouraging. The improvement may prove transitory; but that it prevails there and throughout the Northwest cannot be denied. Jobbers in Milwaukee are doing a better business. The demand for machine tools has grown in Seattle and Portland. The St. Louis market is disappointing; there is simply no buying. Throughout the South trade is below normal. In Birmingham it is duller than ever. There is no demand from any of the principal buyers. The Central South, on the other hand, seems to feel some of the betterment noted in Chicago and finds conditions favorable for increasing business. Good weather in Texas strengthens trade in that section. Pumping machinery for irrigation works is the one bright spot of an otherwise featureless state of affairs in San Francisco. It should be emphasized, however, in conclusion, that a casual scrutiny reveals at least one strong line in nearly every market, and nowhere has any fundamental weakness been found.

New York

NEW YORK, April 22, 1914.

Machine tool builders and dealers generally find very little change in the market, and opinion is divided as to whether it is for better or worse. All declare that it is dull, but do not appear apprehensive of the immediate future. There has been no buying of particular note; nor have any large requirements come to light. It may be said that inquiries are in slightly greater volume than last week. Buying is almost entirely for replacement, for the most part for single tools. Some fair business in second-hand tools is being placed. It is characteristic of conditions that while one dealer found buying poorer and inquiry much better, another declared they were exactly the reverse.

The committee on water, Buffalo, N. Y., has reported favorably on the request of Col. Ward, water commissioner, for \$400,000 of bonds for the completion of the water works system, including the items as follows: Construction of pumping station, \$100,000; treatment plant and valve and meter house, \$100,000; the balance for extension.

The Buffalo Metal Goods Company, 865 Lafayette avenue, Buffalo, N. Y., will build a factory at 196 Winchester avenue, to cost \$8500. W. F. Emerson is president.

The Angle Window & Door Company, 146 Clinton street, Buffalo, N. Y., manufacturer of metal doors and windows, has been incorporated by J. J. Welshofer, W. G. Houck, G. J. Hager, and others. It has acquired the factory and business of the Welshofer-Ringer Metallic Company. C. C. Douglas is manager.

The Buffalo Scale Company, of which Theodore L. Richmond is president, Buffalo, will build, on a site not yet announced, a machine shop and factory, 200 x 300 ft., one story, and a foundry building, 100 x 150 ft., of structural steel and brick, from plans which are being prepared by Robert J. Reidpath & Sons, architects, Builders' Exchange Building.

The Puritan Food Products Company, Fredonia, N. Y., has let general contract for an 80 x 100-ft., three-story and basement brick and stone addition to its plant, to cost, with equipment, about \$30,000.

The American Woolen Company, Fulton, N. Y., of which J. W. Stevens is general manager, has plans in preparation for a dye house, 50 x 150 ft., and a power house, to be built this spring.

Bids will be received until April 24, 8 p. m., by Charles J. Laire, village clerk, Pleasantville, N. Y., for a triplex pump and 30-hp. motor.

The Madrid Springs Company, Madrid Springs,

N. Y., will build and equip a mineral water bottling plant, 40 x 60 ft. F. G. Merriman is manager.

The State Hospital Commission, J. H. B. Hanify, secretary, Albany, is receiving sealed proposals until April 27 for additional boiler capacity, etc., to existing buildings at Gowanda State Hospital, Collins, N. Y.

The Connecting Terminal Elevator Company, Buffalo, will erect a 1,000,000 bu. grain elevator on the Blackwell Canal, opposite the foot of Main street, to replace the one destroyed by fire last month. The cost will be \$400,000. Modern equipment will be installed.

Duncan W. Peck, superintendent of public works, Albany, is receiving sealed proposals until May 5 for constructing four heavy lift bridges over the Erie Canal at Medina, Brockport, Middleport and Lockport respectively, and a dam and sluice-gate across West Canada Creek at Trenton Falls.

John S. Tilley, Watervliet, N. Y., has been incorporated by Herman B. Gaffers and others and has taken over the business of the John S. Tilley Ladders Company.

The Straight Dry Plate Company, Jamestown, N. Y., has let the contract for erection of a factory building, 40 x 100 ft., on Tyrrell avenue.

The Gurney Ball Bearing Company, Jamestown, N. Y., will build an additional story on its entire plant, besides making other additions to plant and equipment to double the productive capacity.

The Riddell Electric Light Company, Luzerne, N. Y., has been incorporated and will equip a plant for electric lighting. E. E. Riddell is president.

The trustees of the village of Goshen, N. Y., will receive bids May 15 for sewage disposal works from plans of Clyde Potts, 30 Church street, New York City, the engineer.

The Peerless Case Works, Elmira, N. Y., maker of school and drafting room equipment, etc., has purchased a factory with equipment but is in the market for a surface belt sander and a lock corner machine.

The city of Schenectady, N. Y., will issue \$300,000 of bonds for completing the sewage disposal plant, etc.

The Fleischmann Company, 701 Washington street, New York City, yeast maker, is building an extension to its plant at Peekskill, N. Y.

Incorporation papers have been filed by Coon Brothers, Inc., Troy, N. Y., to manufacture shirts, collars, etc. W. H. Coon and M. A. Graham, Troy, are among the incorporators. The capital stock is \$125,000.

The Eugene G. Sackett Company, Rochester, has been granted articles of incorporation to manufacture fireplace mantels, fixtures, etc. Capital stock, \$30,000. Eugene G., T. H. and G. C. Sackett, Rochester, are the directors.

The Delta Machine Works, Inc., 28 Franklyn street, Astoria, N. Y., has been incorporated with a capital stock of \$15,000 by F. H. Schwegler, 5 Beekman street, New York City, to manufacture pearl button making machinery, etc. It has acquired the shop of the defunct Long Island Machine Works, Inc. Joseph Komancek is president.

Shalito Brothers, manufacturers of tin cans, 262 South street, New York City, have bought the premises at 264-5-6-7-8 South street and will greatly remodel and improve the property for their purposes. They will then have 50,000 sq. ft. of manufacturing space. They will install considerable additional equipment of can-making machinery.

Coust & Bolton, Newark, N. J., manufacturers of leather belting, have leased the factory at 42-46 Lafayette street, Newark, with a total floor space of 6000 sq. ft.

The Robertson Novelty Company, 100 New street, Newark, N. J., manufacturer of picture frames, etc., has purchased a lot 75 x 208 ft., and will build a factory.

The Ferguson Brothers Mfg. Company, Hoboken, N. J., furniture manufacturer, will build a five-story factory, 100 x 200 ft., at Eighth and Monroe streets.

A contract has been awarded to the Westinghouse-Church-Kerr Company by the Taylor-Wharton Iron & Steel Company for the erection of a 25-acre plant of the company in Easton, Pa., and for enlargement of its present plant in High Bridge, N. J. The contract aggregates \$2,000,000.

New England

BOSTON, MASS., April 21, 1914.

The machinery people are complaining that the immediate outlook is not at all good. This branch of industry seems to have been hit hardest of all. Other metal lines are more prosperous, to a greater or less degree. The general situation presents various anomalies. For example, the woolen industry is operating with a large volume of orders, though profits are small, and the feeling is that the crisis of the new tariff has been passed, which removes a large source of worry. It is pointed out that the backward spring is having much effect. Hope still exists that the buying movement which comes with the return of warm weather should have a strong influence all along the line to bring about a revival of business.

John P. Elton and Harris Whittemore, receivers of the Waterbury Watch Company, Waterbury, Conn., have petitioned the Superior Court for permission to sell the plant at public auction May 4.

The Morse Twist Drill & Machine Company, New Bedford, Mass., has petitioned the city for the right to erect a two-story wooden building to be used as a drafting room and pattern shop.

Chicago

CHICAGO, ILL., April 20, 1914.

Although the number of new and enlarged factories for which building contracts are being let seems to be somewhat smaller, the inquiry for equipment in connection with projects previously mentioned is now being received by sellers of machinery. Sales also are feeling the effects of this buying in some degree, and reports of business for the first half of April sound the first note of encouragement that has been heard for many weeks. How permanent the improvement will be is the interesting question. Thus far the business available has done little more than to excite competition.

The Heywood Brothers & Wakefield Company, Chicago, has made preparation for the building of a six-story brick factory, 150 x 160 ft., the cost of which is estimated to be \$175,000.

The Crane Company, Chicago, has let the contracts for six additional buildings at its Corwith plant, for which nearly 4000 tons of steel has been ordered.

These additional contracts represent an expenditure of about \$400,000.

S. Scott Joy, architect, 3400 South Racine avenue, Chicago, has prepared plans for a six-story factory to be erected for the Stanley Works, manufacturer of builders' hardware.

The Ajax Brass Mfg. Company, Chicago, has been organized with a capital of \$10,000 to operate a brass foundry by John F. Lockrey, 667 West Sixty-third place, Cyril A. Soans and A. H. Graves.

The Rezny Sash & Door Mill, Berwyn, a suburb of Chicago, has filed incorporation papers providing for a capital stock of \$8000.

The Illinois Automobile Company, Galesburg, Ill., suffered a loss of about \$25,000 in the destruction of its plant by fire.

The Sanitary Stove Mfg. Company, Benton, Ill., has filed notice of an increase in its capital stock from \$175,000 to \$300,000.

The Illinois Torpedo Company, Lawrenceville, Ill., has increased the capital stock from \$10,000 to \$50,000 and will add to the capacity of its factory.

The David Wigert Boiler Works has removed from Galesburg to Canton, Ill., and has changed its legal name to the Wigert Boiler Works. It will add some equipment.

A. Smythe, auditor, Elk Point, S. D., will receive bids until April 30 for the following items, to be included in the construction of the municipal electric lighting plant: Two 125-hp. gas producers, one 125-hp. gas engine, one 75-hp. gas engine, direct connected, respectively, to one 75-kw. and one 50-kw. alternator, with the necessary accessories, etc. E. D. Jackson, St. Paul, Minn., is the engineer.

The American Carbolite Company, Duluth, Minn., is proceeding with extensions of its plant which, with new equipment to be installed, will involve an expenditure of about \$50,000.

The plant of the American Motor Company, Indianapolis, Ind., has been purchased by Samuel L. Winteritz & Co. and will be sold at auction April 30.

Philadelphia

PHILADELPHIA, PA., April 20, 1914.

Harry T. Saunders, 31 South Eighteenth street, Philadelphia, will build a one-story machine shop, 45 x 132 ft., at 229 North Twenty-third street. The Smith Hardican Company is the contractor.

The Edwin J. Schoettle Company, 237 North Sixth street, Philadelphia, manufacturer of paper boxes, etc., has purchased property at Eleventh and Brandywine streets, which it will use to increase its manufacturing facilities.

The Standard Refrigerator Company, 2543 Germantown avenue, Philadelphia, will build a two-story factory, 55 x 120 ft., at an estimated cost of \$14,000. Machinery requirements have not been decided on.

The sinking fund commission, Harrisburg, Pa., will sell bonds to the amount of \$25,000 for the municipal street repair plant.

The town of Hancock, Md., has devoted \$30,000 of bonds for waterworks.

The American Brass Novelty Company, 1237 Ridge avenue, Philadelphia, has been incorporated to manufacture a patented gas flashlight. It is being manufactured at present under contract. H. W. Seybert is president and H. B. Tustin secretary.

The Bettendorf Company, Davenport, Iowa, is contemplating the establishment of an Eastern car-building plant at South Bethlehem, Pa.

Milwaukee

MILWAUKEE, WIS., April 20, 1914.

Reports show a considerable range of opinion, but tool makers generally declare that business is improving rapidly. This is due more to the time of the year than any particular general betterment. Power equipment manufacturers report more inquiry and a few orders, with prospects of some good business develop-

ing shortly. Jobbers in tools and tool steels are enjoying improved business.

Logemann Brothers, 284 Oregon street, Milwaukee, Wis., engineers and machinists, are preparing to build a new plant at Thirty-second and Burleigh streets, Milwaukee, to cost \$15,000. Eugene R. Libert, architect, is in charge. The building will be of concrete and steel, one-story, 50 x 200 ft. A traveling crane will be required, in addition to a small list of new tool equipment.

The Koehring Machine Company, Thirty-first street and Concordia avenue, Milwaukee, manufacturer of power concrete machinery, has awarded contracts for the construction of a \$12,000 machine shop, 118 x 150 ft., of reinforced concrete, to the Northwestern Concrete Company, Milwaukee. Equipment is being purchased. Philip A. Koehring is general manager.

The Bradley & Metcalf Company, 207 East Water street, Milwaukee, manufacturer of boots and shoes, has purchased the Kuehn Building, Milwaukee and Detroit streets, and will remodel and re-equip for occupancy July 1.

The River Falls Power Company, River Falls, Wis., will install a hydroelectric plant, etc.

The Chippewa Foundry & Machine Company, Chippewa Falls, Wis., has been incorporated with a capital stock of \$25,000 by Fred Ziegahn, Ben Ziegahn, T. R. Minert, K. A. Froberg and G. Johnson, of St. Paul, Minn. It has purchased a factory and will equip to do a general foundry and machine shop business, and will also manufacture pumps. Foundry and machine shop equipment are needed.

M. S. Matteson, Unity, Wis., will equip to do automobile repair work, and is in the market for the following machines: Drill press, lathe, emery wheels, gasoline engine, air compressor, gas welding machine and numerous small tools, for blacksmithing, etc.

The Chicago Rotary Engine Company, Chicago, has opened negotiations with the Business League of Oconomowoc, Wis., with a view to establishing its proposed shops there. The capital stock is \$100,000 and Oconomowoc capital is expected to take \$20,000. The proposition is being favorably received.

The Theo. Filtz Sons Company, Cadott, Wis., manufacturing veneer goods and boxes, is planning to move the business to Chippewa Falls, Wis. Local capital is willing to assist by providing a site for a large fireproof woodworking plant.

The Borden Condensed Milk Company, Monroe, Wis., will install additional pumping and well equipment at its factory at once, so it can take care of the city water supply during the reconstruction of the city waterworks.

The Vaughn Mfg. Company, Jefferson, Wis., has opened a department for the manufacture of steel and wood and all-steel wheelbarrows. P. W. Hibbard is manager.

The recently organized Olsen Concrete Mixer Company, Elkhorn, Wis., has started to equip a small shop for the manufacture of the Olsen power batch mixer. Alfred G. Olsen is president.

The C. A. Lawton Company, DePere, Wis., woodworking machinery, gas engines, etc., is installing a No. 6 Potter & Johnson full automatic manufacturing lathe, a 12-spindle universal multiple drill, an automatic screw machine and punch press and is otherwise enlarging and improving its plans and equipment.

The Halstead Burglar Alarm Company, Appleton, Wis., capital stock \$5000, has been organized by Charles Ender, E. Kofend and J. P. Frank to engage in the manufacture and installation of alarm systems.

The West Bend Aluminum Company, West Bend, Wis., has awarded a contract for the erection of its new factory, 60 x 240 ft.

The business of the Racine File Company, Racine, Wis., has been reorganized as a corporation by Myron, Charles and Edward McAvoy. The capital stock is \$50,000 and the old name is retained. The McAvoys are making plans for the immediate construction of a large two-story shop building.

The Gund Mfg. Company, LaCrosse, Wis., manufacturing drive twist anchors for fastening guy wires, will expend \$15,000 for the construction of an addition

and the purchase of new equipment for the LaCrosse works. At the same time a branch workshop will be established at Hamburg, Germany, to handle all foreign business. The LaCrosse works will have an output of 220,000 anchors annually when the addition is completed. C. R. Pieper is general manager.

Cincinnati

CINCINNATI, OHIO, April 20, 1914.

A large number of local machine tool builders are attending the joint annual conventions of the National Machine Tool Builders' Association, and the National Metal Trades Association, now in session at Worcester, Mass. Reports from several indicate no change in the situation, with the exception of a few domestic orders recently placed that have helped out the local trade to some extent. Both common and skilled labor is plentiful, but in the face of this it is rumored that May 1 will mark the beginning of labor troubles in the building lines. This will have little effect in manufacturing circles, as very few new additions to plants are planned. Electrical equipment continues in better demand than any other kind of machinery. Second-hand machinery dealers are not doing a very brisk business, but have a number of prospects in sight. Only a few of the jobbing foundries are operating more than 50 per cent. of capacity.

The city of Norwood, Ohio, is advertising for bids on additional equipment for the municipal electric lighting plant. H. J. Pierson is director of public service.

The Boss Washing Machine Company, Norwood, Ohio, has had plans completed for the erection of a factory to take the place of one destroyed by fire several months ago.

The city of Dayton, Ohio, is contemplating establishing a central machine shop for the repair of its motor cars and electric lighting and waterworks equipment. Fowler Smith is purchasing agent. Nothing is yet known as to equipment details.

The Edgemont Machine Company, Dayton, Ohio, has acquired an additional site, adjoining its plant, but is not planning any immediate extensions of its present factory.

It is currently reported that the American Safe & Lock Company, Cincinnati, contemplates moving its plant to Anderson, Ind. No details are yet available.

The Cast Stone Company, Columbus, Ohio, J. E. Wycoff, president, will erect a plant at Eleventh avenue and the Pennsylvania Railroad, for the manufacture of artificial stone.

The Atlas Brass Foundry Company, Columbus, Ohio, has been incorporated with \$65,000 capital stock by John Wittmann, and others. The company operates a brass foundry at 991 South Front street.

The John W. Brown Mfg. Company, Columbus, Ohio, has increased its capital stock from \$370,000 to \$400,000 to take care of improvements to its plant, recently mentioned as contemplated.

It is reported by the daily press that the New England Paper Company, Franklin, Ohio, intends to erect a plant at Lancaster, Ohio. A. B. Smith is president.

The Long Furniture Company, Chillicothe, Ohio, is having plans prepared for a large addition to its plant.

The Medina Foundry Company, Medina, Ohio, will erect a foundry building that will be 70 x 100 ft., one story and of brick and steel construction.

Cleveland

CLEVELAND, OHIO, April 20, 1914.

The demand for about all lines of machinery is dull. Inquiries for machine tools are principally for single machines and in most cases buyers are very slow in placing orders. Considerable prospective business has been held up and it is uncertain when this will be placed. Conditions in most manufacturing lines in the metal working industries do not appear to be improv-

ing, but are getting no worse. Makers of automobile parts are quite busy. The opening of spring has resulted in an improvement in the demand for contractors' equipment. In electrical lines the demand for small generators and motors is holding up well. Conditions are unchanged in the foundry trade, the demand being light.

The city of Cleveland will receive bids April 29 for two 250-hp. water tube boilers for the city hospital, for switchboard apparatus and electrically operated high-tension oil switches for sub-station for the municipal electric light plant and for a tunneling machine for the water works department.

The clerk of the board of education, Cleveland, will receive bids until May 4 for installing, heating and ventilating apparatus in three schools.

The United States Air Compressor Company, Cleveland, has been incorporated with a capital stock of \$25,000 to manufacture a line of two-stage air compressors. The company will build a plant at 6526 Carnegie avenue. The building will be a two-story structure, 42 x 70 ft. R. L. Bacher, president of the B. & B. Mfg. Company, is largely interested. Other incorporators are George A. Hunter, W. H. Bauman, W. Smith and L. H. Bacher.

The Hendrickson Machine Company, Cleveland, will build a two-story machine shop on Canfield court.

The Willard Storage Battery Company, Cleveland, has leased a portion of the Balkwill Building, on Hamilton avenue, near its plant, and will use the additional space for factory and storage purposes.

The Elyria Foundry Company, Elyria, Ohio, has increased its capital stock from \$50,000 to \$75,000.

The Superior Metal Products Company, Elyria, will erect a factory addition, 66 x 165 ft., of brick, concrete and steel construction, in which it will add to its present lines the manufacture of bicycle and motorcycle saddles.

The Baker-McMillen Company, Akron, Ohio, has sold its plant to the Quaker Oats Company and will erect a new factory. It may be some time, however, before building plans are carried out.

The city of Akron is planning the erection of a machine shop in connection with its fire department.

It is reported that the O. C. Barber Mining & Fertilizer Company, Howenstine, Ohio, will build a large commercial electric power plant.

The Vulcan Mfg. Company, Painesville, Ohio, has increased its capital stock from \$200,000 to \$300,000.

The Bunting Brass & Bronze Company, Toledo, Ohio, has increased its capital stock from \$50,000 to \$100,000.

The Binn Machine Company, Canton, Ohio, has been incorporated with a capital stock of \$25,000 by J. R. Binn, D. W. Webb, E. J. Kress, E. D. Myers and E. A. Crossley.

The Garwood Gas Lamp & Heater Company, Canton, has increased its capital stock from \$20,000 to \$60,000.

R. W. Blatt, engineer, Cleveland, will receive bids until May 5 for constructing a sewage disposal plant for Canton, Ohio.

The Monarch Machine Company, Sidney, Ohio, maker of lathes, will erect a factory building, doubling the capacity of the present plant.

Detroit

DETROIT, MICH., April 20, 1914.

Orders are rather scarce in the local machinery market and what business was transacted was mostly in single tools. There is some new inquiry for standard tools, but inquiries are still considerably below normal. Merchants are inclined to look for more active conditions in the near future, but to quote one, "while there is a great deal of optimism there is little actual business." The demand for power plant equipment is encouraging. Second-hand tools are in somewhat better demand than new machines, but dealers have good-sized stocks on hand. The foundry situation is practically unchanged. Makers of sheet metal stampings report a fairly good run of orders. Building circles

are active, but the lack of industrial construction is strongly in evidence.

The Banner Cigar Company, Detroit, has taken out a permit covering the erection of a three-story brick factory building, 58 x 102 ft., to cost \$25,000.

The Detroit Edison Illuminating Company, Detroit, has awarded the general contract for the construction of its new east side power plant to the A. A. Albrecht Company. The plant, which will duplicate the company's present one, will with its equipment involve the expenditure of several millions of dollars.

The Grand Rapids Tire Reinforcement Company, Grand Rapids, Mich., has been incorporated with \$10,000 capital stock to manufacture tire repair devices. The company will establish a plant. Milton S. Weaver is at the head of the enterprise.

The Merchants' & Manufacturers' Association, Saginaw, Mich., has completed negotiations whereby the Bransfield-Billings Action & Supply Company will establish a large plant in that city. It is stated that the company, which manufactures piano parts, has already secured a factory.

Fred W. Green, Ionia, Mich., has purchased the plant of the defunct Portland Mfg. Company, at Portland, Mich., at receiver's sale. Information as to what use the plant will be put to is not available.

The Traverse City Iron Works, Traverse City, Mich., has secured the patent rights of the Hot Blast Grate Company, manufacturer of grates and blowers, and will establish a department for their manufacture.

Thomas Brewer, Manistique, Mich., will establish a granite and marble shop. It is planned to erect a building, 35 x 100 ft.

The Jackson Metal Products Company, Jackson, Mich., recently organized, has acquired the plant formerly occupied by the State Foundry Company. The greater part of the necessary equipment has been purchased, but some new machinery will be added. The new company will manufacture radiators and sheet metal stampings.

The taxpayers of Manistique, Mich., have voted to bond for \$35,000 to provide for extensions to the municipal waterworks and electric light systems.

Unionville, Mich., has voted to bond for \$8000 for the establishment of an electric light plant.

The taxpayers of Cadillac, Mich., have voted to bond for \$39,000 for sewage disposal.

The Central South

LOUISVILLE, KY., April 20, 1914.

The machinery market is a little below normal for the season, with fairly good prospects for increasing business. Orders now being received are practically all for small units. Farm engines and small lighting plant equipment are the most active lines. Inquiries are being received for larger engines for cotton gins. Electrical apparatus and machine tools are in only fair demand, while boilers are moving very slowly. Oil and coal operations are becoming heavy and other industrial development is noted.

The National Foundry & Machine Company, 1408 West Main street, Louisville, will replace a 35-hp. dynamo and two blowers destroyed by fire.

The Schimpff-Parrott Printing Company, 212 South Seventh street, Louisville, will replace burned power equipment, including motors.

Specifications are now ready for a 15-ton ice plant to be installed by the Harlan Ice Company at Coxton, Ky. Kenneth Meguire, Starks Building, Louisville, is president.

E. J. O'Brien, 102 West Main street, Louisville, will purchase boilers and other equipment for a large tobacco redrying and storage plant.

The city of Sebree, Ky., will install a waterworks, and will shortly be in the market for engines, pumps, etc.

The P. G. Bottling Works, Princeton, Ky., is contemplating enlarging its plant and may purchase additional pumps, conveyors and other equipment.

J. E. Lang, Jackson, Ky., will purchase stave manufacturing equipment.

The Land Tobacco Redrying & Storage Company, Lexington, Ky., will purchase a 150-hp. engine, etc.

The Union Storage & Redrying Company, Lexington, Ky., is in the market for redrying and power equipment.

The Green River Lumber Company, Memphis, Tenn., has recently completed plans for a double band mill to cost \$60,000. The daily capacity will be 50,000 ft. of lumber. W. C. O'Brian is in charge.

The city of Tiptonville, Tenn., wants bids until April 28 for a waterworks. R. C. Huston, Exchange Building, Memphis, is supervising engineer.

The city of Halls, Tenn., is in the market for a 1000-kw. alternating-current generator and engine, transformer, etc.

The Four States Land & Timber Company, Memphis, Tenn., has been organized by Ernest Parham and others with a capital stock of \$50,000.

The Banner Printing Company, Lebanon, Tenn., has been bought by Lawrence Eskew and John Spears, who are in the market for several motors.

The board of public works, Louisville, Ky., is planning to erect a city garage shortly and considerable repair equipment, including machine tools, will be purchased. John D. Wakefield is chairman.

M. M. Hancock, Sebree, Ky., is in the market for equipment for a flour mill.

M. F. Cheek, Taylorsville, Ky., is planning to erect a garage with a repair shop and will also enlarge his electric plant.

The Fulton Company, Knoxville, Tenn., founder, will add a brass foundry 66 x 170 ft.; an iron foundry, 56 x 105 ft., and a core room and pattern department, 50 x 125 ft.

The Appalachian Club, Knoxville, Tenn., is preparing to enlarge the electric-light plant at Elkmont, Tenn. New equipment will be purchased.

The city of Springfield, Tenn., will purchase an engine and generator to develop 300 kw. Two pumps will also be bought. G. B. Shawver is in charge.

The American Hame & Singletree Company, Chattanooga, Tenn., has been organized by A. T. Holzbog and others with \$20,000 capitalization. A factory is to be erected.

The Cincinnati, New Orleans & Texas Pacific Railway is building at its Chattanooga shops a reinforced concrete painting and repair shop for passenger coaches, to have a capacity of 12 to 15 cars per month. The estimated cost of the improvement is \$65,000. H. Baker, Cincinnati, Ohio, is general manager.

Birmingham

BIRMINGHAM, ALA., April 20, 1914.

The machinery market is duller than at any time this year, and shows no indication of early improvement. There is no demand from railroads, mines, sawmills or large construction operators. The rural trade continues good, but that is a comparatively small percentage of the whole.

The Concrete Products Company, Montgomery, Ala., will enlarge its factory. T. A. Davies is president.

The Dothan Chemical Company, Dothan, Ala., will double the size of its fertilizer plant.

The Superior Pipe Company, Bessemer, Ala., incorporated with a capital stock of \$50,000, has begun the erection of a sanitary iron pipe foundry.

The H. H. Michlin Veneer & Lumber Company, Mount Vernon, Ala., will establish a mill.

The city of Gadsden, Ala., will erect an electric lighting plant. Charles L. Marsh is city engineer.

The Atlanta Refining & Mfg. Company, Atlanta, Ga., has been incorporated with a capital stock of \$25,000 by H. B. Darling, A. B. Raney and J. D. Taylor. A cotton seed oil mill is to be erected.

The Macon Lumber Company, Thomasville, Ga., will establish a sawmill. J. H. Lewis, Donaldson, Ga., is in charge.

Swift & Co., Chicago, will build a cotton oil mill, cotton oil by-product plant and fertilizer factory at Augusta, Ga., at a total cost of \$300,000. The site will embrace seven acres. Electrical power is to be used.

Wheeling

WHEELING, W. VA., April 20, 1914.

The Logan Lighting Company, Logan, W. Va., will take over the lighting system there and build a new power plant.

The Warn Lumber Corporation, Sitlington, W. Va., has been incorporated with \$200,000 capital stock by William Kreiger, Johnstown, Pa.; P. S. Warn, Meyersdale, Pa., and others.

The Stephenson Hardwood Lumber Company, Charleston, W. Va., has been incorporated with \$25,000 capital stock by W. O. Abney, E. B. Stephenson, and others.

The Wood Fibre Asphalt Company, Charleston, W. Va., has been incorporated with \$250,000 capital stock by A. G. Wamock, W. G. MacCorkle, S. B. Clinton, and others.

The Elkhorn Brick & Supply Company, Van Lear Junction, Ky., has been incorporated with \$20,000 capital stock by F. L. McCue, and others, of Jenkins, Ky.

The Handle Works & Lumber Company, Parkersburg, W. Va., has been incorporated with \$10,000 capital stock by T. J. Hynes, T. J. Garrity, and others.

St. Louis

ST. LOUIS, Mo., April 20, 1914.

The condition of the machine tool market continues to be disappointing. There is comparatively little business moving, but at the same time there are no evidences of fundamental weakness. Industries are simply buying nothing that can be avoided. Such buying of machinery as takes place is of the peremptory character, and dealers are unable to tempt buying by either persuasive power or inducements. Second-hand material is in much the same condition as new apparatus.

The C. H. Albers Commission Company, St. Louis, will build a grain elevator with a capacity of about 600,000 bu.

Announcement is made that the United Drug Company, Boston, Mass., has decided to construct a drug factory in St. Louis.

The Kuchins Furniture Company, Ninth and Palm streets, St. Louis, recently incorporated with a capital stock of \$50,000 by Roman Kuchinski, and others, has bought a factory and will remodel and equip it for the manufacture of furniture.

The P. Heibel & Sons Box Company, St. Louis, has bought the plant of the Union Iron & Foundry Company, St. Louis, and will re-equip it for its own purposes. It is at Second, Barry and Kosciusko streets.

The W. J. Frank Mfg. Company, St. Louis, has been incorporated with a capital stock of \$15,000 by W. J. Frank, Webster Groves, Mo., and others, to manufacture sheet metal specialties, etc.

The Handlite Mfg. Company, St. Louis, has been incorporated with a capital stock of \$16,000 by A. J. Lindsay, and others, to manufacture patented metal novelties, etc.

The Missouri Fire Appliances Company, St. Louis, has been incorporated with a capital stock of \$50,000 by E. R. Landon, Sr., George H. Johnson and H. L. Halvorson, of Chicago, Ill., and others, to manufacture a patented fire apparatus.

The Aulogo Motor Cap Company, St. Louis, has been incorporated with a capital stock of \$25,000 by James A. Cohoon, Sixteenth street and Lucas avenue, St. Louis; J. F. Hilbert, and others, and will manufacture automobile accessories.

The principal owners of the Elliot Frog & Switch Company, East St. Louis, Ill., will equip a plant to cost \$100,000 for the same class of manufacture at Pueblo, Colo., having acquired site, etc.

The Farmers' & Merchants' Transportation Company, 8011 South Broadway, St. Louis, will install sand and gravel pumps. William Ruprecht is president.

The city of Webster Groves, Mo., will install a complete sewer system to cost \$25,000. R. L. Mook Co. is the engineer.

A grain elevator of about 1,000,000 bu. capacity will be built at Sheffield, Mo., by the Chicago, Milwaukee & St. Paul Railway Company, under the supervision of C. F. Loweth, chief engineer, Chicago, Ill.

The St. Joseph Structural Steel Company, St. Joseph, Mo., organized by T. W. Dodd, Fourth and Franklin streets, will equip to fabricate structural steel for buildings, etc. It has purchased a plant and will enlarge and add equipment.

The General Chemical Company, East St. Louis, Ill., has announced that it will double its manufacturing capacity at a cost of about \$300,000. Martin A. Brunn is general manager.

George D. Locke, Rogers, Ark., and others, have bought the Harrison Electric Light & Ice Company, changed the name to the Harrison Gas & Electric Company, made the capital \$100,000 and will erect a new plant. R. M. Fellows retains the ice plant and will expend \$25,000 on additional equipment.

The Tucker Duck & Rubber Company, Fort Smith, Ark., has been incorporated with a capital stock of \$60,000 by H. T. Tucker, and others.

The Little Rock Auto Company, Little Rock, Ark., George B. Rose, owner, will rebuild the garage and repair plant recently burned with a loss of \$45,000. Equipment is being sought.

W. M. Williams, Junction City, Ark., will equip a woodworking factory, including power plant, jointer, hand saw, drill press and other machinery, and is in the market for bids.

The Patterson-Clark Company, Colcord Building, Oklahoma City, Okla., recently incorporated with \$100,000 capital by B. G. Patterson, and others, will manufacture special inventions.

The Acme Milling Company, Oklahoma City, Okla., has been incorporated with a capital stock of \$100,000 by Geo. C. Sohlberg, and others.

The Tishomingo Development Company, Tishomingo, Okla., has plans for a cotton mill to cost about \$500,000. E. E. Pendergrass is president.

The Delta Tile Company, Greenville, Miss., capital stock \$50,000, has been incorporated by Leroy Percy, Morris Rosenstock, and others. Cement tile is to be manufactured.

The Tishomingo Concrete Tie Company, Tishomingo, Miss., has been incorporated with a capital stock of \$200,000 by A. E. Robinson, J. T. Whitener and M. W. Cozart, and will manufacture concrete ties, etc.

The water and light department, Belzona, Miss., has plans for the installation of generating equipment, boiler and engine. J. J. Sisloff is manager.

The Mississippi Electric Company, Columbus, Miss., has been incorporated with a capital stock of \$1,000,000 by Charles F. Sherrod, F. W. Crosby, Battle Bell, and others. Specific plans have not been announced.

Whitaker Bros., Meridian, Miss., will equip a spoke mill and are reported in the market for equipment and a power plant.

J. H. Bernhard, vice-president of the Alabama & New Orleans Transportation Company, New Orleans, La., has plans for the construction of floating shipyards below New Orleans, to be built in ten units, the first being open for bids now and the tenth to be built next and to comprise the machine shop and equipment. An investment of \$5,000,000 is contemplated.

The city of Melville, La., will install an electric light and power plant to cost about \$15,000. The mayor is in charge.

The St. Louis Frog & Switch Company, St. Louis, Mo., whose capitalization was recently increased from \$200,000 to \$350,000, will build a foundry for the manufacture of manganese steel castings for special track work.

The Kansas City Malleable Iron Company, Kansas City, Mo., is erecting a malleable foundry, 70 x 200 ft.

Texas

AUSTIN, TEXAS, April 18, 1914.

Settled weather has stimulated business activities and machinery dealers report a very satisfactory increase in trade. An impetus to the good roads building

movement is noted all over the State, and the demand for road-making machinery is heavier than ever known here. Many companies are being formed to construct new cotton gins and cotton-seed oil mills.

The Anderson Water Company, Anderson, will make improvements to its water works plant, etc.

The Kennard Cotton Oil & Mfg. Company, Kennard, will erect a cotton seed oil mill. J. J. Cooper is president.

The city of El Paso will soon receive bids for improvements to be made on the city water works plant and sewerage system at a cost of \$250,000.

The Texas Power & Light Company, Sherman, will expend \$18,000 in improving its plant.

The Salt River Valley Water Users' Association has voted to erect 21 irrigation pumping plants within the Roosevelt dam project. The pumps will cost \$500,000. John P. Orme is president.

John Dowdle and associates, Abilene, will erect a mattress factory at Lufkin.

The Northern Utilities Company, Dallas, has been organized to erect plants to supply electric power, gas and ice manufacturing plants and erect and operate municipal waterworks plants in northern Texas. The capital stock is \$500,000. The incorporators are Hiram Grosman, W. C. Woodlief and W. T. Heninger of Dallas.

The Texas Central Railway will move its shops back to Walnut Springs from De Leon.

The Lone Star Gas Company, Ft. Worth, will increase its capital stock to \$1,000,000 for the construction of a compressor plant, to generally extend its properties and improve its facilities. H. C. Edrington is president and E. R. Brown, general manager.

The Pacific Northwest

SEATTLE, WASH., April 14, 1914.

The machinery market shows further improvement, especially in the sale of milling machinery, and the outlook is more promising than it was the first of last month. Tool builders report a better demand and an increased volume of inquiries, mostly local. Electrical equipment is having a very good sale, particularly motors for industrial plants, lighting apparatus, etc.

Richard Kinnear, 310 Burke Building, Seattle, has awarded to Ira S. Harding, 227 Tenth street, north, the contract for construction of a three-story concrete paper box factory, which he will erect on Western avenue and Vine street, at an estimated cost of about \$25,000. It will be equipped with thoroughly modern machinery.

The National Producers' & Consumers' Alliance, Seattle, has been incorporated by John C. Slater, G. A. Lee, and others. Plans for a series of cold storage and fruit by-product plants throughout the fruit districts of the Northwest are being made.

James Churchill, Centralia, Wash., glove manufacturer, plans the immediate erection of a factory.

J. W. Johnson, Hinckley Block, Seattle, has formed a company which will erect a plant for the manufacture of a concrete interlocking block.

The Republic Light & Power Company, Republic, Wash., has increased its capital stock from \$10,000 to \$20,000. The additional funds will be used in improvements to its properties.

The Tacoma Fire Door Company, Tacoma, has increased its capital stock from \$84,000 to \$168,000 for the purpose of adding to its factory, and installing new machinery.

J. C. Skinner, manager of the Northwestern Fruit Exchange, Hood River, Ore., is authority for the statement that his company will make improvements in its properties, including the installation of additional cold storage facilities.

The Willapa Power Company, South Bend, Wash., has been incorporated with a capital stock of \$1,000,000. It will develop and operate electric power plants. Williamson S. Summers, H. R. Harriman, and others are the incorporators. Its offices are for the present in the White Building, Seattle.

The Bend Water, Light & Power Company, Bend,

Ore. will build an ice plant with 14 tons daily capacity. It will cost about \$15,000. The Union Iron Works, Seattle, has been awarded the contract for machinery.

The Doernbecker Mfg. Company, Portland, Ore., will erect a \$70,000 concrete factory, six stories.

The Glendive Heat, Light & Power Company, Glendive, Mont., has increased its capital stock by \$65,000, to be used in improvements and additions.

O. E. Norell, city clerk, Mountain Home, Idaho, will receive bids until April 30 for a sewer system to cost approximately \$25,000.

The St. Maries Cold Storage Company, St. Maries, Idaho, is having plans prepared for an ice plant.

The Butte Water Company, Butte, Mont., will start work on improvements estimated to cost \$300,000. New machinery will be required, including a large pump.

San Francisco

SAN FRANCISCO, CAL., April 15, 1914.

Machine tool business appears very quiet as compared with last month, when the letting of delayed contracts brought an appearance of activity. Definite inquiries of much importance are lacking, and the garages, though needing some equipment, are not inclined to undertake any large expenditure. Dealers report just about enough single-tool business to cover expenses, but look for a gradual revival from now on. A slightly better movement of abrasives, small tools, etc., is taken as a favorable indication.

Shipbuilding plants on this harbor are fairly busy, with considerable repair work and some new construction. The movement of miscellaneous machinery is gradually broadening, though below normal in several lines. Contractors' equipment is especially slow to revive, owing partly to lack of new work and partly to the large amount of old equipment available. Comparatively little new hydroelectric construction is being undertaken. A marked revival in the California lumber industry is reflected to some extent in the machinery trade. Pumping machinery receives more attention, with inquiries from mines, waterworks and irrigation projects.

The Kawneer Mfg. Company, San Francisco, manufacturer of metal store fronts, etc., is building a shop at Berkeley, Cal.

The Enterprise Foundry, San Francisco, is repairing extensive damage caused by a fire in its plant March 22.

The Comstock Pumping Association is taking figures on large oil engines, which will be placed at Virginia City, Nev., to operate electric generators of 1500-kw. capacity.

The commissioners of Orange County, Cal., are taking bids for a hoisting engine, etc.

The Auto Machine Works, San Francisco, has been incorporated with a capital stock of \$20,000 by W. J. Lewis, N. H. Dunn and J. Robinson.

Fred Ward & Son, San Francisco, have ordered additional stock for their machine tool department, and have placed Joseph Sattler, formerly with the Pacific Tool & Supply Company, in charge of this part of their business. The company has just secured the James Ohlen saw line, and will devote an entire floor of its building to this stock.

The Atchison, Topeka & Santa Fé Railway announces that its shop at Richmond, Cal., will be greatly enlarged.

Western Canada

WINNIPEG, MAN., April 17, 1914.

Demand for machinery in western Canada is fair. Indications are, however, that in the course of a few weeks there will be an active demand for equipment for various kinds of manufacturing plants that are now under contemplation. It is reported that architects and contractors are quite busy, figuring on a number of factory buildings, etc. Building permits issued in Winnipeg since the first of the year are now near an

aggregate of \$5,000,000, which is much larger than in the corresponding period of last year.

Work has started on the factory of the Medicine Hat Radiator Company, Ltd., Medicine Hat, Alta. L. Carey Wright, formerly of Sauk Centre, Minn., is manager. It will be equipped with special machinery.

By-laws amounting to \$94,000 for waterworks and sewerage extension have been passed at Estevan, Sask.

The Western Tire & Rubber Company, Regina, Sask., will shortly begin work on a factory to cost \$175,000. The company has been capitalized at \$1,000,000. W. D. Wilson, of Wilson, Lytle & Badgerow, Ltd., Toronto, is president.

The Sunset Mfg. Company, Ltd., Winnipeg, will build a factory for the manufacture of cotton and jute bags at an estimated cost of \$150,000.

Langstaff & Schurg, Emo, Ont., will erect a box factory at Keewatin.

The Canadian Carco Engineering Company, Ltd., Winnipeg, has been incorporated for manufacturing electrical machinery, etc. The capital stock is \$20,000.

Harry V. Shaw, Edmonton, Alta., will erect a four-story factory estimated to cost approximately \$65,000. Magoon & MacDonald, Edmonton, are the architects.

Officials of the Swift Canadian Company, Edmonton, Alta., state that it will erect a three-story addition of brick and steel to its plant. The capacity will be greatly increased and new machinery will be installed.

The ratepayers of Revelstoke, B. C., passed a by-law to grant \$40,000 for extensions to the power plant.

Eastern Canada

TORONTO, ONT., April 20, 1914.

As a direct result of the recent tariff changes, the Algoma Steel Corporation, Sault Ste. Marie, Ont., will install a heavy structural mill of large capacity, according to a statement made by J. F. Taylor.

The ratepayers of Wiarton, Ont., passed a by-law to grant a loan of \$25,000 to the Canadian Casket Company, which will erect a plant there.

The John Ver Mehr Engineering Company, London, England, and William Cowlin & Son, Toronto, have been awarded the contract for the erection of the new filter plant at Toronto. The amount bid is \$1,177,054. The plans include a boiler house, pumping station, etc.

The chairman of the board of control, Toronto, Ont., will receive bids until April 28 for furnishing and installing cold storage equipment in the municipal abattoir. W. R. Perrin, 530 King street, east, is the engineer.

The Dominion Chain Company, Montreal, Que., manufacturer of anti-skid tire chains, is making arrangements to build a factory at Niagara Falls, Ont. W. P. Kearney, Montreal, is general manager.

The board of water commissioners, Brantford, Ont., will receive bids until April 30, for two 4,000,000-gal. turbine pumps, two motors, etc.

The City Council, Wallaceburg, Ont., will receive bids until May 5 for waterworks, etc. Chipman & Powers, Mail Building, Toronto, are the engineers.

The taxpayers of Seaside, Ont., have voted \$42,000 for a waterworks system.

The Canadian Consolidated Felt Company, Montreal, will make additions to one of its factories. D. Lorne McGibbon is president.

The United Gas & Fuel Company, Hamilton, Ont., will erect a coke and gas plant to cost \$2,000,000.

The Dominion Engineering & Machinery Company, Toronto, is being incorporated with a capital stock of \$2,000,000 to take over the Ontario Wind Engine & Pump Company, Ltd. The increase in capital will allow for extensions to the plant, etc.

Damage by fire to the extent of \$30,000 was done to the plant of the Wolverine Brass Works Company, Chatham, Ont. The company will rebuild at once.

The Rice Cigar-Box Mfg. Company, London, Ont., was destroyed by fire with a loss of about \$26,000.

It is announced that the Canadian branch of Libby, McNeill & Libby, Chicago, Ill., will erect a milk condensing plant at Embro, Ont., to cost about \$100,000.

The Canadian Burrell Company, Ltd., Windsor, Ont.,

has been incorporated with a capital stock of \$40,000 by J. C. Burrell, G. S. Middleton, Leo Weiss, of Detroit, Mich., and others, to manufacture machinery, etc.

The Windsor Factories & Real Estate Company, Ltd., Toronto, has been incorporated with a capital stock of \$500,000 by R. A. Staton, Ambrose Staton, and others, to manufacture machinery, automobiles, etc.

Government Purchases

WASHINGTON, D. C., April 20, 1914.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until May 5, schedule 6656, for one duplex fire pump of 500 gal. per min. capacity, Underwriter type, for Ft. Lafayette, New York harbor; schedule 6663, for three 1-ton and three $\frac{1}{2}$ -ton self-contained electric hoists for Norfolk; until May 26, schedule 6685, for five portable rivet forges for Mare Island; schedule 6686, for one universal motor-driven wood working machine, f.o.b. Rixey, Colo.

Bids will be received by the chief of the Bureau of Yards and Docks, Navy Department, Washington, until May 2, for furnishing and installing one three-motor, 20-ton electric traveling crane for Boston.

The general purchasing officer, Panama Canal, at Washington, will receive bids until May 8 for centrifugal pumps and motors, previously mentioned.

The U. S. Reclamation Service, 605 Federal Building, Los Angeles, Cal., will receive bids until May 11 for furnishing electrical apparatus for the Okanogan project, Wash. O. H. Ensign is chief electrical engineer.

No bids were received by the Bureau of Engraving and Printing, Washington, on March 14, in response to special advertisement calling for bids for furnishing 15 motor equipments for power printing presses.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, on April 14 for furnishing material and supplies for the navy yards as follows:

Schedule 6527, Steam Engineering.

Class 162, Puget Sound—One pipe threading and cutting machine, with auxiliaries and spare parts—Bid 30, \$1056; 69, \$771; 88, \$590.80; 97, \$1144; 108, \$1178.

Alternate—Same, f.o.b. works—Bid 69, \$683.55; 75, \$626.29; 76, \$656.75; 97, \$1044; 108, \$1063; 122, \$556.55; 136, \$537.80.

Class 163, Puget Sound—One pipe threading and cutting machine, with spare parts—Bid 30, \$1988.70; 69, \$1660; 88, \$1306.90; 97, \$2021; 108, \$2375.

Alternate A—Same, with auxiliaries and spares—Bid 30, \$2158.67; 69, \$1986; 97, \$2163; 108, \$2591.

Alternate B—Same, f.o.b. works, with spares—Bid 69, \$1413.75; 76, \$1472.80; 97, \$1771; 108, \$2058; 122, \$1210.25; 136, \$1211.90.

Alternate C—Same, f.o.b. works, with auxiliaries and spares—Bid 69, \$1733.75; 75, \$1830.67; 76, \$1792.80; 97, \$1913; 108, \$2274.

Schedule 6529, Yards and Docks.

Class 171, New York—2300 ft. conveyor belt and copper rivets and burrs sufficient for making 50 splices for above—Bid 24, \$10,489; 27, \$11,130; 36, \$12,421; 47, \$9345; 53, \$8981.24; 55, units; 57, \$9840; 63, \$8186 and \$7683; 94, \$7805; 95, \$11,324; 107, \$8670; 112, \$10,955; 127, \$10,367; 132, \$10,215; 133, \$10,525.

Alternate—Same, San Francisco—Bid 24, \$11,016.50; 26, \$10,913.80; 27, \$11,130; 55, units; 57, \$9840; 63, \$7134; 127, \$10,852; 133, \$11,215.

The names of the bidders and the numbers under which they are designated in the above list are as follows:

24. Boston Belting Company.
26. Bowers Rubber Works.
27. Buffalo Weaving & Belting Company.
30. Crane Company.
36. Combination Rubber Mfg. Company.
47. E. & J. Dick, Ltd.
53. George S. Fowler.
55. Flint & Chester.
57. B. F. Goodrich Company.
63. Goodyear Tire & Rubber Company.
69. Hallidie Machinery Company.
75. Jarecki Mfg. Company.
76. Kemp Machinery Company.
88. Manhattan Supply Company.
94. Manhattan Rubber Mfg. Company.
95. Mineralized Rubber Company.
97. Manning, Maxwell & Moore.
107. New York Belting & Packing Company.
108. Niles-Bement-Pond Company.
112. New Jersey Car Spring & Rubber Company.
122. Perine Machinery Company.
127. Peerless Rubber & Mfg. Company.
132. Robins Conveying Belt Company.
133. Revere Rubber Company.
136. Rix Compressed Air & Drill Company.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

DEFECTIVE APPLIANCE SELECTED BY INJURED WORKMAN.—An employer is not liable for death of an employee caused by breaking of an emery wheel which the latter and a fellow employee procured from the stock room and put to use without being authorized to do so. (Wisconsin Supreme Court, Priebe vs. Hirsch, 144 Northwestern Reporter 287.)

STIPULATION FOR DAMAGES FOR BREACH OF CONTRACT.—A contract for a sale of machinery may validly provide that on breach of the agreement by one of the parties he shall pay a stipulated amount to the other, although that amount may exceed the damages actually sustained by a breach, unless the provision is incorporated in the contract through fraud or mistake. (Texas Court of Civil Appeals, George M. Dilley & Son vs. Wise & Hervey, 160 Southwestern Reporter 985.)

CONDITIONAL SALE OF HEAVY MACHINERY.—When machinery is sold under agreement reserving title in the seller until payment of the price, it remains personal property, so as to entitle the seller to reclaim it on non-payment, although it may have been firmly affixed to the real estate upon which it has been installed. (Missouri Court of Appeals, American Clay Machinery Company vs. Sedalia Brick & Tile Company, 160 Southwestern Reporter 902.)

LIABILITY FOR BREAKING OF DAM.—One who maintains a dam on his premises to impound water, by changing the natural flow of water, is liable for injury to an adjoining landowner, caused by a breaking of the dam. (Alabama Supreme Court, Sloss-Sheffield Steel & Iron Company vs. Webb, 63 Southern Reporter 518.)

RIGHT TO ATTACH DRAFT TO BILL OF LADING.—When goods are ordered on the buyer's personal credit, and not on an understanding for cash payment, he need not accept a shipment sent under a bill of lading to which draft for the price is attached. (Georgia Court of Appeals, Ware vs. Chason, 80 Southeastern Reporter 21.)

RIGHT OF STOPPAGE IN TRANSIT.—The right given a seller of goods on credit to stop delivery of the goods while they are in transit to the buyer, on discovering that the latter has become insolvent, extends to the time while the shipment is in a warehouse at the destination, if the goods have not yet passed into the buyer's control. (South Carolina Supreme Court, in re F. W. Poe Mfg. Company, 80 Southeastern Reporter 194.)

CONDITIONAL WARRANTY OF APPLIANCES SOLD.—A buyer of a valve cannot rely upon a breach of warranty covering it, to defeat recovery of the price, if he has failed to comply with a clause in the contract of sale requiring him to give the seller notice of any failure of the valve to work, stating wherein it was deficient. (North Dakota Supreme Court, Gould Balance Valve Company vs. Herold, 144 Northwestern Reporter 74.)

TRADE-NAMES FOR PATENTED ARTICLES.—Where, during the life of a patent covering a device, the article comes to be known by the name adopted by the patentee, he is not entitled, on expiration of the patent, to register the name, so as to monopolize it subsequently. (United States District Court, District of Massachusetts, National Lock Washer Company vs. Hobbs Mfg. Company, 210 Federal Reporter 516.)

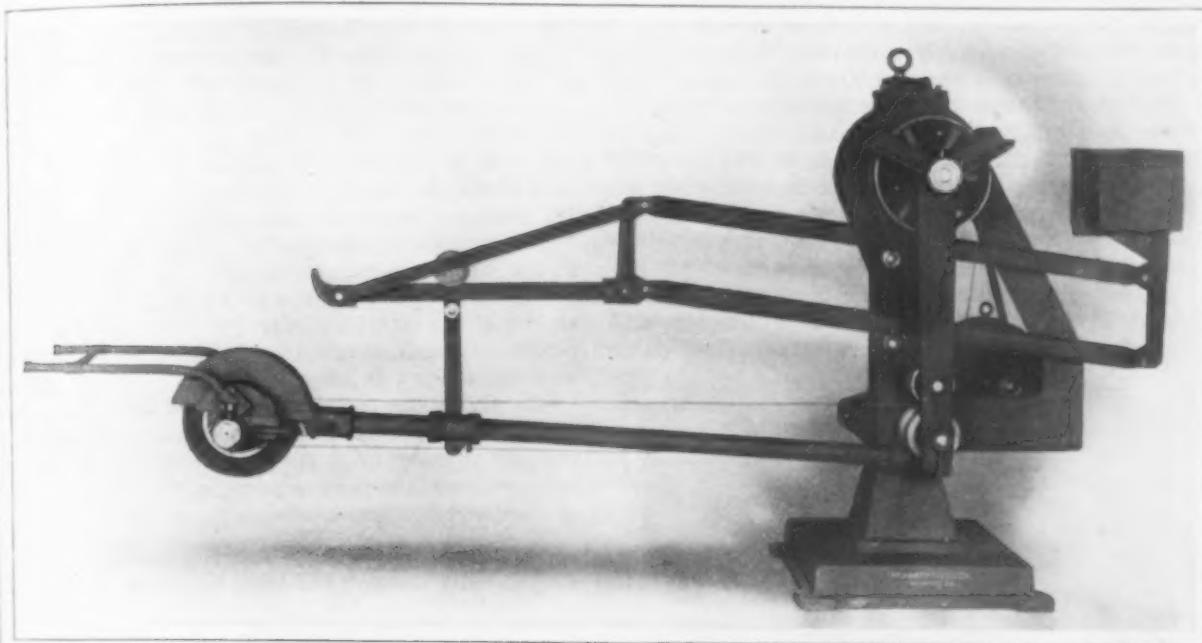
CONDITIONAL SALES OF HEAVY MACHINERY.—Although heavy machinery be bolted to concrete beds of a factory, it will retain its character as personal property, so as to entitle the seller to reclaim it under a conditional sale contract, as against the creditors of the purchaser or his successor, if it can be removed without injury to the building. (United States District Court, Northern District of Ohio, in re Superior Drop Forge & Mfg. Company, 208 Federal Reporter 813.) But when machinery is sold under such a contract, to be affixed to the real estate owned by a third person, the contract is not binding on the third person, unless he had actual notice of the reservation of title. (Iowa Supreme Court, Allis-Chalmers Company vs. City of Atlantic, 144 Northwestern Reporter 346.)

Portable Radial Swing Grinding Machine

For handling work that is ordinarily done by the stationary swing grinding machine and other operations that cannot be handled by this machine on account of the limited radial area over which it can operate, the Mummert-Dixon Company, Hanover, Pa., has brought out a portable radial swing grinding machine. It is designed to handle large and medium sized castings and for doing a general line of buffing work. It is fully self-contained, for

housing by a belt connection, and a shaft is employed to transmit the power from this pulley to the one at the top of the machine.

The machine is mounted on a substantial base that supports the vertical pedestal, on which is mounted the main frame or housing. This can turn readily on the pedestal, and on the side of the housing is a bracket carrying the swing frame in which the pulleys are carried. The swinging arm, at the outer end of which the grinding head is attached, is jointed to the lower end of the swing



A Portable Radial Swing Grinding Machine for Grinding Large and Medium Sized Castings and General Buffing Work

setting up at any convenient place in the shop without any preliminary work. The eye on the top of the machine pedestal enables it to be picked up by an overhead crane and moved to the work to be ground. The arm on which the grinding head is mounted can be turned entirely around the base of the machine.

The machine is driven by a motor mounted on a platform that is part of the main housing. The grinding head and the swinging arm are carried back and forth by a roller bearing trolley which rolls on a track held in a horizontal position by two parallel arms. At the other end of these arms on the main housing is placed the counterweight. It is emphasized that this combination of parallel arms will keep the head perfectly balanced irrespective of the position of the trolley on the track, an arrangement which gives a free and easy movement to the swinging arm and eliminates the tendency of the arm with its weight to find its own center of gravity. The grinding head can be turned to an angle of 90 deg. in either direction, which enables the sides of castings to be ground.

The emery wheel in the grinding head is shielded by a hood, and the handles attached to the head give the operator full control. The wheel arbor runs in phosphor bronze bearings which are provided with means of taking up wear. Safety flanges are provided for the arbor, which will take a wheel up to 18 in. in diameter, with a 3-in. face.

A single belt, which is carried around the jointed connection of the swinging arm and hanging swing frame by two idler pulleys and then to the large pulley at the top of the machine, is used in driving the grinding wheel. Power from the motor is transmitted to a driving pulley on the inside of the

frame. The frame hangs on two phosphor bronze bushings passing through the top bracket and serving as bearings for the drive shaft.

Pierce, Butler & Pierce Company Reorganization

At meetings recently held at Syracuse, N. Y., plans were formulated for the reorganization of the Pierce, Butler & Pierce Mfg. Company. Two separate corporations will be organized—the Pierce Company, of Syracuse, and the Kellogg-Mackay Company, of Chicago, the common stock of the Chicago company being owned by the Syracuse company. There will be an issue of \$500,000 of 20-year 6 per cent. first mortgage bonds on the real estate at Syracuse. The new Chicago company will put out \$500,000 of 7 per cent. preferred stock and the Syracuse company \$700,000 of such stock, besides \$150,000 of second preferred, 6 per cent. non-cumulative stock. There will be common stock to the value of \$1,200,000. All common stock is to be in a voting trust of five members: Theodore Ahrens, president Standard Sanitary Mfg. Company; Richard Garlick, treasurer Youngstown Sheet & Tube Company; M. J. Alexander, Pittsburgh; a representative of Spencer, Trask & Co. and a representative of Campbell, Heath & Co.

It is stated on behalf of the Bridge Builders' and Structural Society that none of the Manhattan Elevated third-tracking material, amounting to about 50,000 tons, was included in the March tonnage referred to in the announcement of the society that 76 per cent. of the entire capacity of the bridge and structural shops of the country was contracted for in March. This tonnage will appear in the figures for April contracts.

The Jarvis Machinery & Supply Company, Huntington, W. Va., filed a voluntary petition in bankruptcy showing liabilities of \$53,408.39 and assets, \$80,408.39.

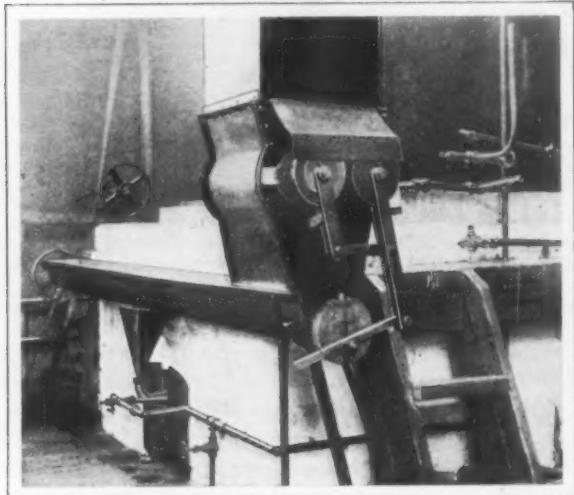
Burning Pulverized Coal and Oil Mixed

Results Obtained with the Fuel Utilized Under a Steam Boiler—Loss of Combustible in Plants Using Ordinary Coal

BY ALEXANDER TRAUTD

Noting the recent articles in technical journals regarding the burning of pulverized coal prompts me to put in writing the results of several tests I made in 1906-1907. Although tests were run using plain pulverized Clearfield coal, anthracite and coke, also combinations of the above with crude molasses and combinations with fuel oil, I will give here only the results obtained from the Clearfield coal and oil mixture which proved best after numerous trials and combinations. Bear in mind that these combinations were absolutely dustless and could be handled like a very fine moist sand.

The boiler used was a Roberts safety water tube. It was placed on a firebrick base about 3 ft. high. Inside of the base a narrow combustion



Coal Burner and Apparatus As Applied to Boiler

chamber was built about 2 ft. wide and 2 ft. high and extending half the length of the boiler. From mud drum to mud drum and extending the entire length of the boiler, there was a firebrick arch having 2 x 2 in. openings equally spaced. Closing the front of the furnace was a double sheet iron door with a 2-in. hole in the center through which the burner was placed.

The fuel was supplied to the burner by means of 12 x 12 in. hopper in which two 6-in. rolls 12 in. long were placed in a horizontal position. Each roll had 12 vanes $\frac{3}{8}$ in. high and 12 in. long equally spaced around the circumference. By means of dogs and ratchet wheels these rolls were made to revolve and deliver a constant quantity of fuel to a 4-in. screw conveyor in a horizontal position, as indicated in the accompanying reproduction of a photograph, and extending over the entire width of the furnace.

Directly over the center line of the burner $\frac{3}{8}$ -in. holes were drilled in the bottom and sides of the trough to allow the fuel, as it was being pushed forward by the screw, to drop into a small hopper attached to the burner. From the hopper the fuel was blown into the furnace by means of a steam jet which passed through a hole about $\frac{1}{8}$ in. in diameter. Of course considerable experimenting was necessary before the right shape and size of burner

was obtained to divide the fuel finely on entering the combustion chamber. The average pressure of the steam used was about 93 lb.

It is obvious that by this screw conveyor method a whole battery of boilers could be fed, each one getting the exact amount of fuel required. In case any one of the boilers were cut out, a small slide underneath the holes in the conveyor trough was closed and the surplus fuel passed on to the end of the conveyor, where in large plants it could be conveyed back to the storage bin. The fire was started in the furnace by means of wood fanned into a white hot flame by means of the steam jet from the burner, which on starting was fed from an auxiliary boiler. It took about 15 min. before the furnace was hot enough to blow in the fuel.

In the accompanying report of three tests no alterations were made in the furnace, feeding apparatus, burner or fuel. The better economic results were obtained by a more nearly correct supply of fuel and better manipulation.

Tests of Steam Boiler with Pulverized Fuel

(A) Alternate method of starting and stopping tests was used.
(B) Boiler:—Roberts safety water tube.
(C) Water heating surface = 400 sq. ft.
(D) Superheating surface = 50 sq. ft.
(E) 1 cu. ft. of fuel = 27.32 lb.

Item	Total Quantities		
	1	2	3
1 Duration of trial, hr.....	4	5.58	5.58
2 Weight of mixture as fired, lb..	404	626.94	737.5
3 Residue in lb.....	.....	.....	47.5
4 Percentage of residue in fuel.....	.....	.....	6.4
5 Weight of water to boiler in lb. 2,962.75	4,655.72	5,925.5	
6 Factor of evaporation.....	1.0379	1.0864	1.0573
7 Water actually evaporated corrected for superheat, lb.....	3,156.81	4,994.22	6,856.1
8 Equivalent water evaporated into dry steam from and at 212 deg., lb.....	3,434.29	5,425.72	6,911

Hourly Quantities

9 Fuel consumed per hour, lb....	101	112.35	132.16
10 Water evaporated per hour corrected for superheat, lb....	789.2	895.02	1,139.1

11 Equivalent evaporation per hour from and at 212 deg., lb....	858.57	972.35	1,238.58
12 Equivalent evaporation per hour from and at 212 deg. per sq. ft. of heating surface, lb....	1.9	2.43	2.75

Average Pressures and Temperatures

13 Steam pressure by gauge, lb...	98.1	91.2	93.2
14 Temperature of feed water entering boiler, deg. F.....	164.4	165.5	165
15 Temperature of escaping gases from boiler, deg. F.....	432	448	461
16 Superheat in steam, deg.....	113	.....	131.7
17 Temperature inside room, deg..	70.1	73.5	77.9
18 Temperature outside, deg.....	39.6	28.6	34.9

Economic Results

19 Horsepower developed	24.88	28.18	35.9
20 Builders' rating, hp.....	.....	.....	.....
21 Percentage of builders' rating..	.....	.....	.....
22 Water apparently evaporated under actual conditions per lb. of fuel, as fired, lb.....	7.81	7.42	6.6
23 Equivalent evaporation from and at 212 deg., per lb. of fuel, as fired, lb.....	8.5	8.65	9.01
24 Fuel used per hp. hr., lb.....	4.6	4.00	3.88
25 Equivalent evaporation per lb. of combustible, lb.....	.....	.....	10

For the last $3\frac{1}{4}$ hr. of test No. 3 my data sheets show a consumption of $423\frac{1}{4}$ lb. of water every 20 min. As the fuel supply was constant, this shows that when the furnace reached its maximum temperature, the evaporative power of the boiler became constant and maximum for the weight of fuel consumed per hour. The temperature of the flue gases during the last $3\frac{1}{4}$ hr. was constant at 480 deg., whereas the average temperature of the whole test was 432 deg. F.

If we consider the last $3\frac{1}{4}$ hr. of test No. 3 only, the economic results would be as follows:

(1) Water apparently evaporated under actual conditions, per lb. of fuel as fired.....	9.51 lb.
(2) Equivalent evaporation from and at 212 deg., per lb. of fuel as fired.....	10.34 lb.
(3) Equivalent evaporation from and at 212 deg., per lb. of combustible	11 lb.
(4) Fuel used per hour, per hp.....	3.33 lb.
(5) Combustible consumed per hour, per h.p.....	3.12 lb.

These last results are comparable to some of the most efficient tests ever run on large economical water tube boilers of the best make and setting. Combustion took place without smoke, and the ash was a grayish white powder, practically free from carbon.

To get an idea of the amount of good coal wasted in boiler house ash, several samples were taken, and the good coal very carefully separated from the ash by hand. The results are as follows:

(1) Average sample of soft coal ash from a Jersey City power house: 3 lb. ash contained 0.9 lb. of coal, or 30 per cent.
(2) Average sample of rice coal ash from a large brewery in Newark: 1.75 lb. ash contained 0.6 lb. of coal, or 34 per cent.
(3) Average sample of No. 2 buckwheat ash from a large apartment hotel in New York: 4 lb. ash contained 1.25 lb. of coal, or 31 per cent.

This gives one a very good notion of how much good coal goes to waste in the ash pile.

Activity at a Mexico City Rolling Mill

Indications that business within the turbulent jurisdiction of Mexico has not received its mortal wound are welcome. A letter received from President Harry Wright, of the Consolidated Rolling Mills & Foundries Company, located in Mexico City, gives evidence of progress in the face of an unfavorable situation and also corrects an error made by some of our readers in supposing this company to be located at Mexico, Mo. Mr. Wright's letter is in part as follows:

"This company is capitalized at \$3,000,000 (pesos) and has assets in excess of liabilities of about \$2,000,000 (pesos), the remaining \$1,000,000 being in the form of good-will, etc. We operate a brass and metal foundry, being practically the only exclusive plant of this kind in the republic doing considerable business in brass and other castings. We have a plant in Mexico City and one in Tampico for the manufacture of corrugated tanks and culverts. We also deal largely in second-hand machinery, relaying rails and railroad equipment.

"Our rolling mill located in Mexico City consists of 18-in., 16-in. and 10-in. mills, rolling commercial sizes from 1-in. x 6-in. flats down and shapes from 4 in. down, and reducing rails lighter than 20 lb. The mill is operated by four 250-hp. Cahall waste heat boilers. Our process at the present time is to work direct from scrap piles. We have in prospect as soon as political conditions have slightly changed in Mexico the installation of a small open-hearth steel plant combined with a steel foundry.

"Our output at the present time is about 500 tons of finished iron per month. We use crude oil for fuel and hope, by the addition of the small open-hearth furnace, to triple our production. The business has been established about 10 years; rolling mill a little over one year. Notwithstanding the small amount of railroad mileage in operation in Mexico at the present time, and diverse political and financial conditions, we have made progress and are very much encouraged over the future of our business."

Safety Suction Punch Press Devices

The Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has done considerable experimenting with mechanical safety devices of various kinds for the punch shop. Among those which have been developed as the result of this study is one in which it is not necessary for the operator to approach the danger point at any time during the operation of the press, as he feeds and clears it with the same tool. Another advantage about the device is that it is unnecessary for the operator to take hold of the material, particularly in the case of small pieces, with his hands. In this way it is pointed out that the numerous small cuts which he receives when inserting the blanks with his fingers are prevented. It is emphasized that the double handle device used on large work is placed so that it is impossible, by reason of their size, to get hold of the sheets in any other way, and for that reason the operator is compelled to use the device.

Prior to the adoption of this method the sheets were fed in from the back of the press by a man stationed at that point. As his fingers were entirely at the mercy of the operator located at the front of the press, frequent injuries resulted. It is stated, however, that since the adoption of the suction device there has not been an amputation on the large presses and no fingers have been removed up to the present time in the punch shop.

The device was exhibited and received the grand prize at the recent International Exposition



A Punch Press Equipped with Suction Device for Keeping the Operator's Hands Out of the Danger Zone

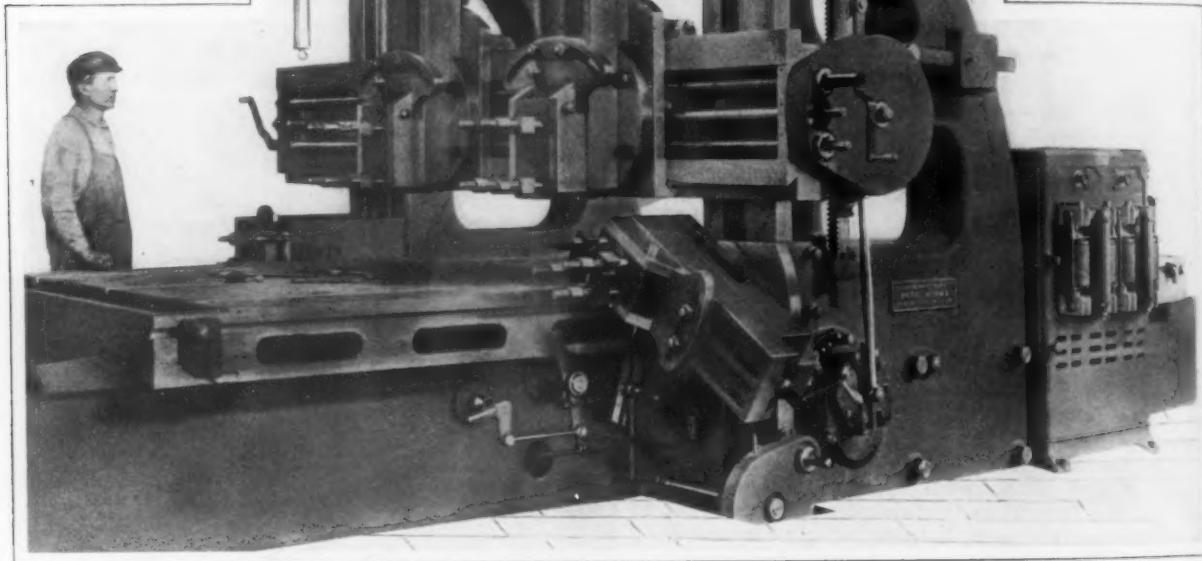
of Safety and Sanitation in New York City. The company also employs a number of safety devices, such as magnetic lifters, sliding devices, etc., adapted for the different kinds of punchings made.

The Cleveland Ice Machine & Mfg. Company, Lorain, Ohio, has filed a voluntary petition in bankruptcy in the federal court in Cleveland, giving its assets as \$241,111 and liabilities, \$70,011. D. R. Sipe has been appointed receiver.

HEAVY DUTY PLANING MACHINE

A Large Installation in a Shop Producing Steel Car Underframe Parts

The Niles-Bement-Pond Company, 111 Broadway, New York City, has recently built a number of planing machines at its Pond Works for the Commonwealth Steel Company, St. Louis, Mo. They will plane work 120 in. wide and 72 in. high, 96 in. wide and 72 in. high and 86 in. wide and 48 in. high, the length handled by each machine being the same, 18 ft. The machines are built with two heads on the cross-rail and one side head on each upright. The machine illustrated is one of the smallest size, and is one



One of a Number of Heavy Planing Machines Installed in a Shop for Machining the Open-Hearth Steel Castings Used in Car Underframes, Etc.

of the 29 machines installed in the plant for machining open-hearth steel casting double body bolsters and platforms for passenger underframes and also for machining steel truck frames for passenger cars, locomotives and tenders and a one-piece tender underframe.

Although rated as a 48 x 86-in. machine, the actual space between the uprights and the table and the cross-rail is 2 in. greater. It is driven by a 50-hp. reversing motor of the builder's special system, which is directly connected to the gearing. The speed of the table, which is 80 in. wide and 20 ft. long, can be adjusted instantly without stopping by conveniently located handwheels on the controller. With this arrangement cutting speeds of between 25 and 50 ft. per min. and a return of between 50 and 90 ft. per min. can be secured. The driving motor is directly connected to the first driving shaft at the back of the machine, where it is out of the operator's way. The controller, resistance, pilot switch and circuit breaker are mounted in a ventilated cabinet. This contains all the wiring except the wires between the controller and the motor, which are carried across the bed of the machine in metal conduit.

The operating levers, which are located on the front and back of the bed, are connected with the reversing switch and can be operated by hand or automatically by adjustable dogs on the table. At the instant the motor is reversed a set of connections in the controller disconnect it from the line. The motor then becomes a dynamic brake, which if pointed out will stop the table instantly without taking current from the line.

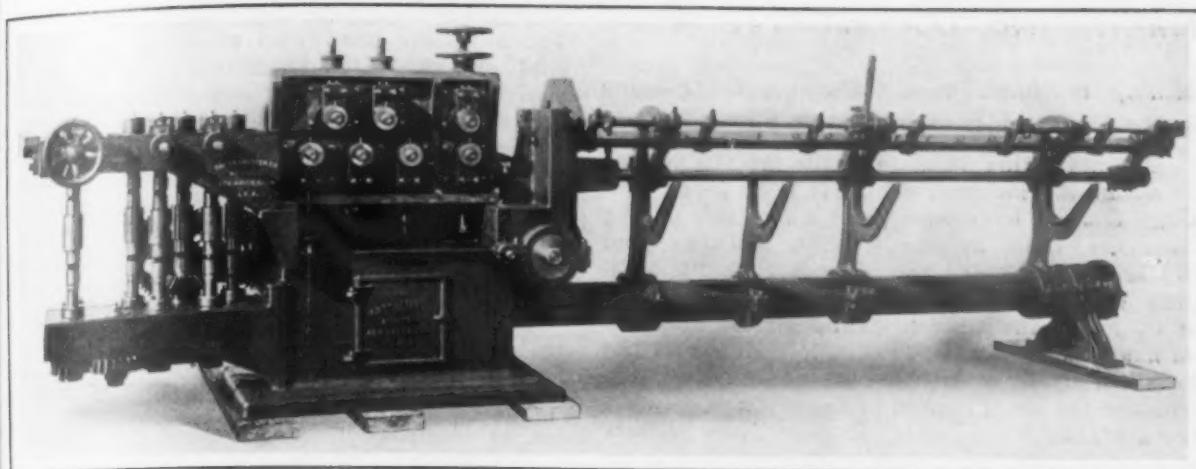
To prevent the table from running off the gearing or breakage of the tools or machine, caused by the failure of the line current or an overload on the motor, a circuit breaker is provided that stops the motor at once by dynamic braking. The cross-rail is raised and lowered by an independent reversible motor, which

is mounted on the top of the arch in the center.

A pendant switch carried by a swiveling bracket, mounted on the arch, can be moved by the operator to any convenient position. In this way he has control of the driving motor for starting, stopping or reversing the table, irrespective of whether he is in reach of the ordinary operating levers or not.

Roll Straightening and Cutting Machine

A recent addition to the line of straightening and cutting machinery for square and hexagonal stock built by the F. B. Shuster Company, New Haven, Conn., is a geared roll straightening and cutting machine. The special feature of this new machine, which is an improvement on the one illustrated in *The Iron Age*, April 4, 1912, is an independent adjustment of each of the vertical and horizontal straightening rolls, which is accomplished by universal joints connecting the straightening roll and the roll gear shafts. In this way a wide adjustment of the rolls without changing the meshing of the gears is secured, and it is pointed out that only one set of rolls is required to handle the complete range of sizes of any one shape within



Front View of an Improved Geared Roll Straightening and Cutting Machine for Square and Hexagon Stock

the capacity of the machine. This results in a saving both in the cost of the extra rolls and also in the time required for changing the sets. The capacity of the machine is squares, hexagons and rounds from $\frac{3}{8}$ to $\frac{3}{4}$ in., and the rolls are grooved for the shape of material they are to handle. The machine is arranged to cut to a maximum length of 20 ft., but if desired a greater length can be arranged for.

The housing, containing five vertical and the same number of horizontal straightening rolls, is mounted on the bed of the machine. These rolls are adjusted by the square head screws shown, and in addition there is a set of feed rolls at the rear and another at the front of the machine. The machine is driven by a balance wheel, which connects with a train of gears operating all of the rolls. In operation the coil of material is placed on the reel at the rear of the machine and passes through guides arranged to receive it into the back feed rolls. Here the material is gripped and carried along through the horizontal and vertical straightening rolls and out through the front feed rolls and the stationary die into the covered guide bar. A gauge, which has been previously set for the desired length of cut, is mounted in the guide bar, and as soon as the material strikes the gauge, it brings a clutch mechanism into action. This mechanism stops the feeding of the stock instantly,

and the operation of feeding and cutting continues until the coil is completely cut up. It is emphasized the stopping of the feed rolls during the cutting-off operation prevents any crowding of heavy material against the cutters.

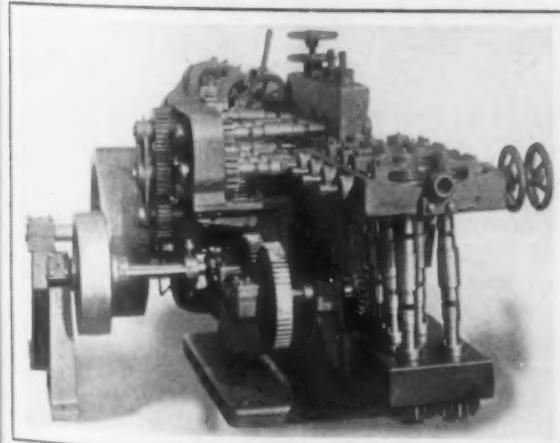
E. D. Clapp's Fiftieth Anniversary

The E. D. Clapp Mfg. Company, Auburn, N. Y., manufacturer of carriage, automobile and special drop forgings, last week celebrated the 50th anniversary of its establishment. The company, which was originally known as E. D. Clapp & Co., was established in April, 1864, occupying floor space 25 x 40 ft., beginning with the manufacture of a thill coupling invented by E. D. Clapp. The growth of the firm in the manufacture of carriage hardware was rapid, and enlargements of plant were required from time to time. The present company was incorporated in 1876. In 1881 a rolling mill was added and this was in operation until destroyed by fire in 1885. E. D. Clapp, the founder of the business, died in 1899.

The company is one of the survivors of the fittest in the carriage forging business, inasmuch as most of its contemporaries of 1864 have either retired or taken up other lines. Most of the carriage forgings used 50 years ago were made in New England, but they are now produced in New York, Pennsylvania and Ohio. In turn, the company added bicycle and automobile forgings to its line and at present produces a large variety for various purposes. The company has the reputation of operating a steady shop, as it has not shut down for lack of business since 1864, except during the panic of 1893. It has had but one strike and that 30 years ago. Among its employees is one who has served 45 years continuously and another 40 years, while the president, D. E. Clapp, has served in various capacities for 39 years. Many others have served from 22 years upward. In all, 19 of these men have worked an aggregate of 564 years, or an average of practically 30 years each.

The Auburn Citizen, in commenting editorially upon the career of the company, said: "In these days, when long tenure is considered an economic loss and old and even middle-aged men are let go to make way for the ever present young men, when the boss and the employee are far removed socially, it is splendid to find such an example of industrial harmony, intelligence, and recognition of the dignity of labor as we find to-day in the E. D. Clapp Mfg. Company."

In line with the action of a Massachusetts manufacturer, as referred to in these columns last week, in putting out several thousand letters to his customers urging them to send to Washington their views on the freight rate increase is a letter addressed by the American Blower Company, Detroit, to the Interstate Commerce Commission. It favors the increase, saying that manufacturers have for some years felt the upward trend in production cost and that similar conditions prevail in regard to railroads.



An End View Showing the Universal Joint Adjustment for the Rolls

and at the same time the cut-off mechanism is brought into play and the piece of stock is cut off. At the same time the cover of the guide bar is raised and the cut piece drops into the forked holders placed below to receive it. The feed rolls are set in motion again by the return of the cutter

MACHINING LOCOMOTIVE RODS

Milling Machines as a Substitute for Planing Machines in an Eastern Shop

An interesting example of the modern method of machining locomotive rods is to be found in a large Eastern locomotive plant where two milling machines, built by the Newton Machine Tool Works, Twenty-third and Vine streets, Philadelphia, Pa., are installed. The machines are rated at 30 in. by the builder. Although the machines do not possess sufficient range to slab two of the largest rods in a flat position at one time, the width of the cut is limited by the distance between the uprights, 30 in., which in most cases permits of operating for the surface or channeling cuts on two rods simultaneously, finishing the flats and edges.

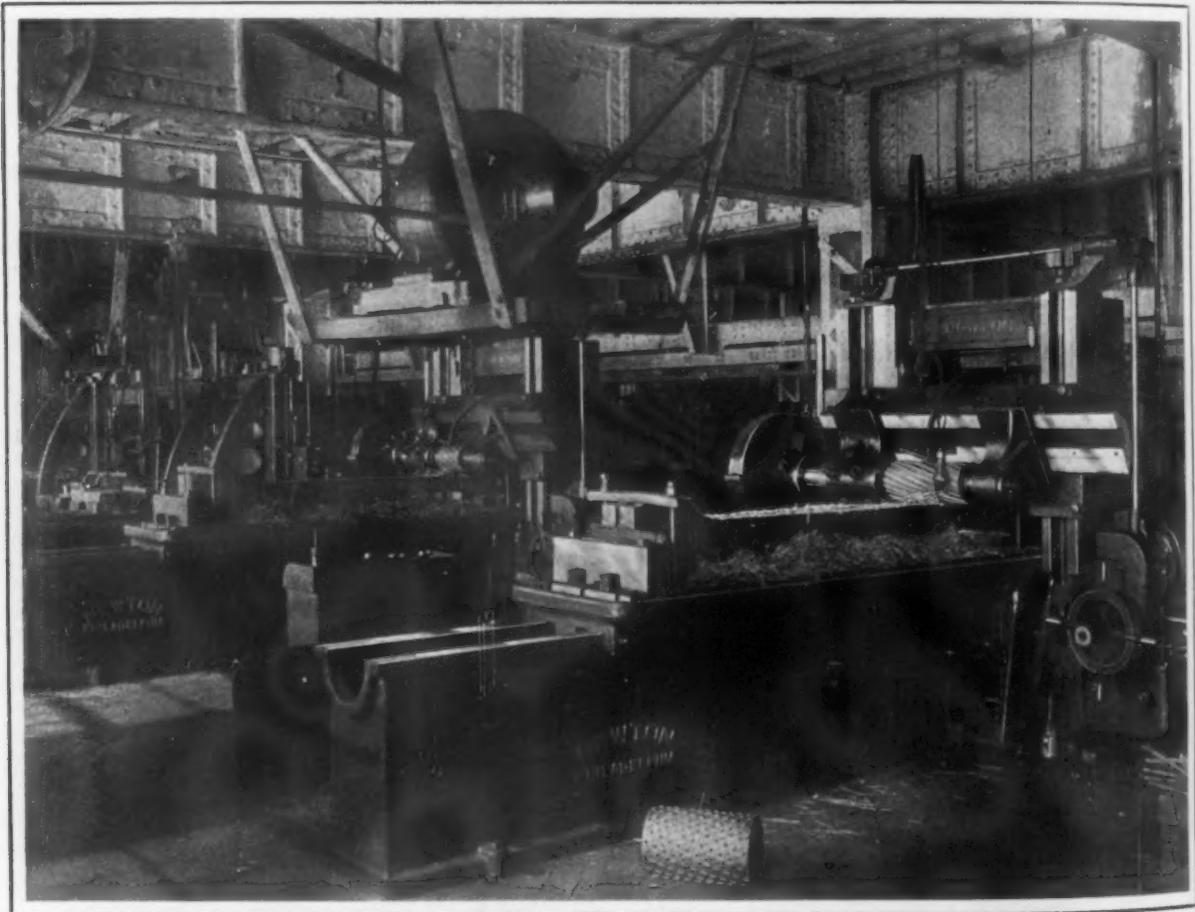
The machines were altered to suit the particular accident prevention rules existing in the plant where they were installed. These changes included the placing of the cross-rail counterweights

direction of movement of the main operating lever. The adjusting handwheel slides on a horizontal shaft and has two positions, one for adjusting the work table and the other for elevating the cross-rail. Vertical fast power elevation is provided for the rail and a lock clutch is furnished for the table motion. This is relied upon to prevent the work drawing under the cutter when milling the necks of rods and sinking cuts for channels, etc. An oil pan surrounds the table to carry off the lubricant which is returned to the cutter by a pump and the necessary attachments.

The following table gives the principal dimensions of the machine:

	In.
Width between uprights.....	30
Maximum distance between spindle center and top of work table.....	30
Diameter of spindle.....	5
Side adjustment of spindle.....	8
Distance between spindle center and underside of cross-rail.....	24
Maximum cutter diameter.....	12
Width of work table.....	24

This size of machine was installed to substantiate the builder's claims of increased output, through the location of operating levers and the



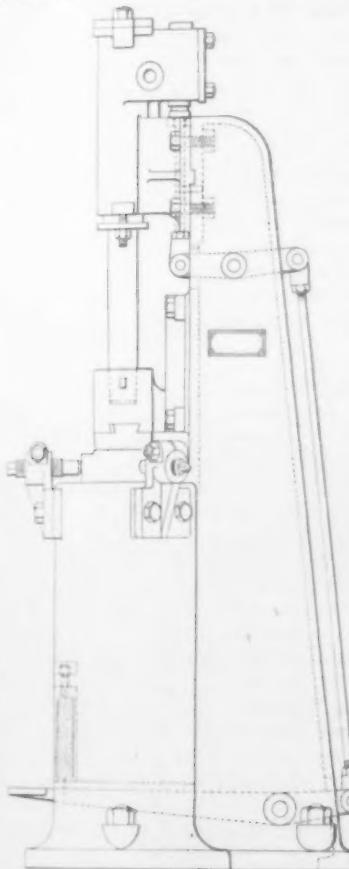
Finishing Locomotive Rods by Milling with Peg or Solid Edge Cutters Instead of Planing

in the uprights and boxing in the motor and all other parts not conveniently taken care of by gear covers. Each machine is driven by one 25-hp. motor having a speed range of 2 to 1. This controls all operations. The drive to the spindle is through a steel worm fitted with roller thrust bearings, the sleeve worm wheel having a bronze ring of steep lead, and both being incased for continuous lubrication. The work table, which is 24 in. wide, has angular rack and spiral gear drive with gear feed having nine changes and the power quick return in both directions. The direction of traverse of the table is indicated by the

flexibility of control, and it is figured that after two years of constant service, both day and night, a long life for the cutters was secured and a flattening rate of output compared with the larger machines ordinarily used for this work. While the duty has been very heavy in this time, it is stated that the bearings have not become overheated, which, it is pointed out, is due to the fact that all parts having opposed stresses have bearings in a common casting. It will be noticed from the engraving that the machines have been tried out in every condition with various styles of cutters, including the peg and solid cutting edge types.

A Rapid Production Pneumatic Hammer

For the manufacture of die stamped parts from sheet metal, which are ordinarily produced with a board drop hammer, the Pennsylvania Pneumatic Company, Erie, Pa., has brought out a pneumatic hammer of the rapid production type. The special object in the design of this tool was to eliminate the board, friction rollers, gears, clutches, pulleys, belts, shafts, automatic trips, etc., characterizing the majority of hammers, used in this class of work.



A Recently Developed Pneumatic Hammer for the Rapid Production of Die Stamped Parts from Sheet Metal, Etc.

housing at the back, which in turn supports the air cylinder. The pistons and the rod are turned from one piece of special steel, the former being of a comparatively large diameter. The hammer head is a special steel forging and has large guides on the rear housing.

The hammer is held automatically in the upper position and will not fall until the operator presses the foot lever controlling the valve for admitting air to the air cylinder. It is pointed out that in this way a quick, positive and snappy blow is secured, and when the pressure on the treadle is released the hammer rises to the upper position rapidly and will not strike the cylinder head under any condition, as there is an effective and noiseless air-cushioned stoppage. The valve is an improved D slide type, which, it is emphasized, will not become leaky through wear, and the valve gear, which is free from catches or similar devices, works smoothly. The lower die block is centered by three screws and provision is made for locking it in position. The dies are accessible on three sides, without any interference of the side housings.

The total height of the size of hammer shown is 56 in. or approximately half as high as a board drop when in the upper position. The force of the blow is varied to suit the thickness or hardness of the stock worked by a simple and improved

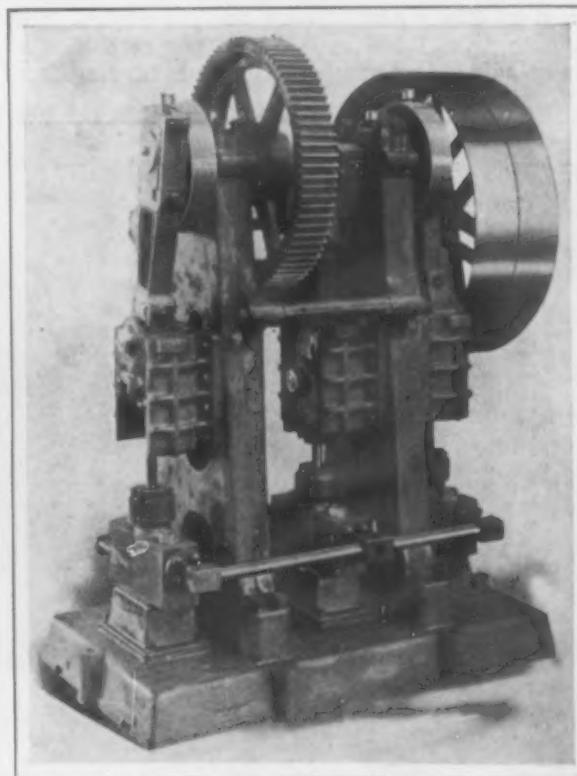
reducing valve on the air line at the hammer. It is emphasized that in this way it is possible to vary the pressure quickly and positively to give any blow within the capacity of the hammer with a constant height of drop and irrespective of the air pressure being carried. The hammer is also built with a hand-operated valve gear and foot-controlled throttle for light tool and similar forging work. In this case the centering screws are omitted and the die block is keyed to the anvil.

Vertical Triplex Hydraulic Pump

A new vertical type of single-acting triplex hydraulic pump has been designed by the Hydraulic Press Mfg. Company, Mt. Gilead, Ohio, and is being built in three sizes. The pumps are driven either by belt or electric motor and are designed for a pressure capacity of from 600 to 16,000 lb. per sq. in., depending on the size of the piston.

When intended for high-pressure work the pumps are fitted with screw glands working against followers, while for low pressures, where large pistons are employed, stud glands are used. The high-pressure pump cylinders and crankshafts are made from forged steel and the cross-heads are guided and fitted with cast-iron adjusting shoes, which are bored. The connecting rods are made of open-hearth steel castings and have bronze bearings with wedge and screw adjustment at both ends.

When the pump is equipped with belt drive there is a single gear reduction in the smallest size, which requires 25 hp. for its operation and a double reduction in the two larger sizes, which require 50 and 100 hp. respectively. The arrangement of



A Vertical Single-Acting Triplex Hydraulic Pump for Pressures Ranging from 600 to 16,000 Lb.

the pulleys is such that the pump can be driven from either end. With motor drive double reduction gears are used on all sizes, the ratio of the first being 5 to 1, while that of the second depends upon the speed of the motor used. The effective speed

of each of the three pistons is $33\frac{1}{3}$ ft. per min. for the smallest pump and 45 ft. for the two larger sizes. The smallest pump, which has a stroke of 8 in., is equipped with plungers ranging from $\frac{7}{8}$ to $3\frac{1}{4}$ in. in diameter. The length of stroke in the other two sizes is the same, 12 in., and the plunger diameters range from 1 to $4\frac{1}{2}$ in. and from $1\frac{1}{4}$ to 5 in. respectively. All of the pistons are packed with compression packings. The over-all height of the smallest pump is 69 in. and that of the largest 106 in.

A 22-In. Sliding Extension Gap Lathe

The Barnes Drill Company, Rockford, Ill., has brought out a new 22-36-in. sliding extension gap lathe, having a bed 102 in. long. This tool is adapted to a general class of work in a shop where the demands are of wide range, but where the work is not of such a nature as to require the installation of a standard 36-in. lathe or to warrant that expense. The weight of the bed and the moving parts are proportioned to give a rigid tool under the demands of heavy duty and are machined to meet the necessities of accurate work. The main and sliding beds are planed and scraped together and are firmly braced throughout their length. The lathe will take work between centers with the gap closed 50 in. in length, while the gap has a maximum opening of 36 in. The top bed, which is made $24\frac{7}{8}$ in. wide, extends beyond the main bed to provide a firm support for the carriage when turning large diameter work in the gap. This arrangement is relied upon to eliminate the necessity for an auxiliary brace.

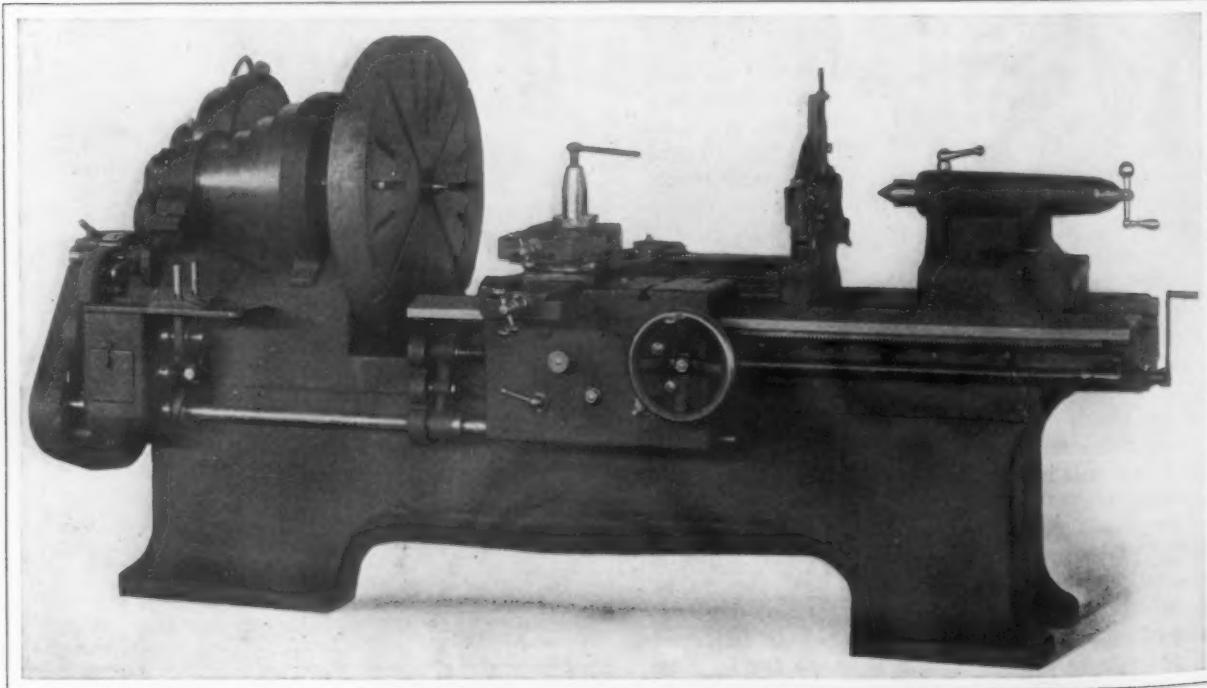
The lathe has cone pulley drive, with a four-step pulley. There are 12 spindle speeds, ranging from 2.3 to 400 r.p.m., with a countershaft speed of 200 r.p.m. There are six geared feeds ranging from 0.008 to 0.123 in. per revolution of the spindle. Any number of threads ranging from

Lake Iron Ore Book for 1914

The Lake Superior Iron Ore Association, Rockefeller Building, Cleveland, has published its booklet of analyses of Lake ores shipped in the season of 1913. These become the basis of guarantees for 1914, and in addition are given analyses which will govern shipments in 1914 of ores not heretofore on the market. For example, on the Cuyuna Range are three new ores—Crow Wing, Ironton Townsite and Thompson. The Ironton is conspicuous for high content of iron, having 60.34 per cent., dried at 212 deg. The phosphorus is 0.161 and the moisture 15.73 per cent. In the list of Canadian ores the Magpie appears for the first time. The dried analysis shows 51.60 per cent. iron, 0.010 phosphorus, 7.42 silica, 2.92 manganese, 0.62 alumina, 8.55 lime, 8.25 magnesia and 0.123 sulphur. The moisture is 2.46 per cent. There are 41 pages of analyses in this year's book as against 38 in last year's. The number of ores listed shows an increase of 17, or from 279 to 296. As to the iron content of the various ores listed, changes up and down are seen in the tables, but it would appear that the decreases outnumber the increases, and the average iron content of ores shipped last year was probably less than that of ores shipped in 1912.

In its iron-ore analysis pamphlet for 1914 the Shennango Furnace Company, Pittsburgh, lists the same ores that appeared in a similar publication for 1913. There is the exception, however, that the Whiteside ore appears in the non-Bessemer list only, whereas in 1913 some Bessemer ore was shipped under this name. The Whiteside non-Bessemer of 1914 runs 55.42 per cent. in iron as against 56.60 per cent. in iron in 1913. The guarantees on Clifford and Antoine silicious ores for 1914 are the same as in the preceding year.

According to the Bureau of Foreign and Domestic Commerce, the excess of the value of March exports of merchandise over the imports was only \$5,384,131, being the smallest for a long series of months. This is due to the heavy imports in March, which reached a value of \$181,930,039, while the exports of merchandise attained a value of but \$187,314,170. The imports were the second largest in the history of the country,



A New 22-36-In. Sliding Extension Gap Lathe Designed for a General Run of Shopwork

2 to 20 can be cut. Two sets of back gears, having ratios of 8 to 1 and 44 to 1, respectively, are provided. The net weight of the machine is approximately 5300 lb. and each additional 2 ft of bed increases the weight approximately 600 lb.

having only been exceeded by the imports of last December, which totaled \$184,025,571. The March exports were about \$14,000,000 more than those of February, but were considerably under those of any of the previous five months.

A Heavy Barrel Double Seaming Machine

For use in the manufacture of heavy metal barrels and tanks with double seamed ends, the Niagara Machine & Tool Works, 639 Northland avenue, Buffalo, N. Y., has brought out a double seaming machine. Material as heavy as No. 12 gauge can be double seamed, and the maximum diameter of the barrels and tanks handled is 32 in. The minimum diameter of work is 12 in. and the length that can be seamed ranges from 6 to 44 in. One of the features of the machine is the grouping of the controlling levers in a convenient position for the operator, an arrangement which is relied upon to give a very large output.

As will be noticed from the engraving, the machine is of heavy and massive construction throughout. A pair of bevel gears, one of which is located on the pulley shaft and the other on the spindle of the vertical seaming chuck, transmits the power. The vertical main shaft has an adjustable end thrust bearing, and one is also

depression and flange by a press and set of dies. This arrangement is shown at the left of the accompanying drawing, while the double seamed joint is illustrated in the other portion.

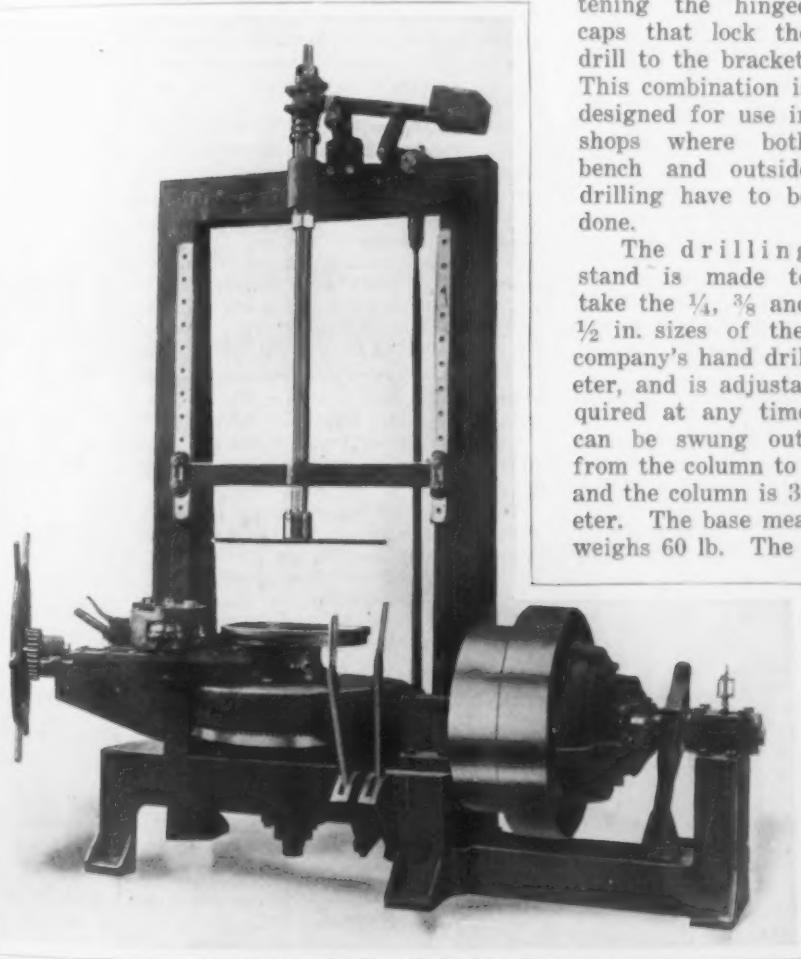
Combination Electric Drill and Stand

The Cincinnati Electrical Tool Company, Cincinnati, Ohio, has brought out a combination portable electric hand drill and a sensitive drilling stand. It is possible to use the drill either independently of the stand, or in combination with it, thus giving two tools in one. The change from one to the other can be made readily as the drill can be inserted or detached in a few seconds by releasing the thumb nuts fastening the hinged caps that lock the drill to the bracket. This combination is designed for use in shops where both bench and outside drilling have to be done.

The drilling stand is made to take the $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ in. sizes of the company's hand drills. The table is 8 in. in diameter, and is adjustable for height. If it is not required at any time by the work being done it can be swung out of the way. The distance from the column to the center of the table is 5 in. and the column is 30 in. high and $1\frac{3}{4}$ in. in diameter. The base measures 9 x 11 in. and the stand weighs 60 lb. The bracket has a 3-in. feed on the



A Combination Portable Electric Hand Drill and Sensitive Drilling Stand



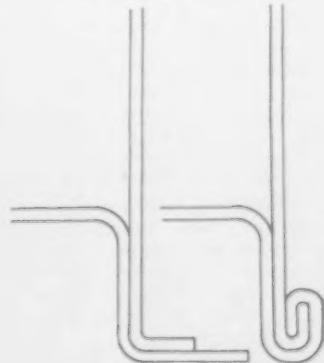
A Double Seaming Machine for Heavy Metal Barrels and Tanks and a Sketch Showing the Formation of the Seams

provided for the top clamping plate, which can be adjusted to take care of the variation in the height of the work. A hand lever actuating a pair of toggles raises and lowers the plate. The seaming roll turret is mounted on a slide, which is operated by a screw and handwheel. Two different speeds are provided for the screw by the use of change gears. A hand lever operating a friction clutch controls the motion of the machine.

In getting the work ready for the seaming operation, the cylindrical ends and bodies are prepared by flanging the former in a flanging machine, while the disks have to be stamped with a

column with quick return and is operated by a hand lever. There is a vertical adjustment through clamping screws on the column, so that the bracket can be set at any desired point. The depth of the hole to be drilled is regulated by a stop located on the column.

As indicating that fatigue in steel is the cause of some failures, the following case is cited: Two beam engines built from the same patterns were supplied for driving a large textile mill. After being started at the same time and working under the same conditions for nearly 20 years the beam of one engine broke. Shortly after the beam of the other engine failed. Each had made about 200,000,000 oscillations.



Trade Publications

Hydraulic Jacks.—Watson-Stillman Company, 190 Fulton street, New York City. Sectional catalogue No. 91, superseding catalogues Nos. 66 and 68 and the jack sections of catalogue No. 82. Illustrations and descriptive matter explain the construction of an extensive line of hydraulic jacks and lifting tools. The catalogue is divided into four sections, three treating of lifting, pulling and pit jacks and motor and battery lifts and a miscellaneous section containing lists of repair parts, tables and a telegraph code. In the first three sections illustrations and brief descriptions of the different jacks are given, together with tables of the sizes that can be furnished. The lifting jacks cover practically all of the standard types and in the pulling jack section a traveling hydraulic lifting jack, which is intended as a substitute for an overhead traveling or cantilever wall crane is shown. The miscellaneous section includes a brief general description of the jacks, directions for operating them and extensive lists of repair parts and accessories.

Belting Shifting Attachment.—R. K. LeBlond Machine Tool Company, Cincinnati, Ohio. Pamphlet. Calls attention to a belt shifting device for use in connection with lathes, milling machines, etc. This device, which was illustrated in *The Iron Age*, December 25, 1913, enables the belt to be shifted from one step of a cone pulley to another by simply turning the crank. The advantages claimed for the use of this device are safety to the operator and speed in making the changes.

Engine Room Supplies.—Franklin Williams, 39 Cortlandt street, New York City. Collection of pamphlets. Deal with a line of engine room accessories, such as oil filters, steam separators, exhaust heads, ventilators and various types of extra heavy and standard flanged fittings. All of these are illustrated and briefly described, with tables of the several sizes in which they can be supplied.

Autogenous Welding.—Waterhouse Welding Company, Pelham street, Boston, Mass. Pamphlet. Pertains to a line of autogenous welding and cutting plants. Views of the several types are given, together with brief descriptions and lists of equipment. Mention is also made of the various supplies which can be furnished. The apparatus is designed for use with tanks of dissolved acetylene, rather than an acetylene generator.

Hard Rubber Pumps, Piping and Fittings.—American Hard Rubber Company, 11 Mercer street, New York City. Catalogue. Illustrates a line of hard rubber pumps, pipe fittings and other utensils designed for use with acid and alkaline solutions, which will either corrode the metal or be contaminated by contact with it. A single page is given to each of the specialties for the most part, and if desired iron piping and hard rubber specialties, such as tanks, jars, scoops, etc., can be furnished with hard rubber linings.

Clam Shell Buckets.—Edgar E. Brosius, Lewis Block, Pittsburgh, Pa. Describes a patented single hook bucket which was illustrated in *The Iron Age*, January 1, 1914. This bucket is readily attached and detached from an overhead traveling crane or hoist and is tripped by a line from the crane cage or the ground. Views of the bucket in use are given, and there is a diagram with dimensions showing the clearances required for various positions.

Shearing Machines.—Cedar Rapids Foundry & Machine Company, Cedar Rapids, Iowa. Pamphlet. Concerned with a line of alligator shearing machines which are especially designed for scrap iron yards and rolling mills and are built in five sizes. Views of the different machines are given and on the facing tables are brief tables of specifications.

Shovels, Dredges, Pile Drivers, Excavators, Wrecking Cranes, Etc.—Cyrus Company, South Milwaukee, Wis. Catalogue No. 14. Covers an extensive line of steam and electric shovels of the railroad and revolving types for use in quarries, railroad work, loading blasted rock, uncovering coal veins, in ore mines and for ditching work. Views are given of the shovels in use for these several purposes with brief text descriptions underneath the engravings. General operating information regarding the shovels is also given. Mention is made of dragline excavators, dredges of various types, wrecking cranes, a locomotive pile driver and an unloading plow. Illustrations and brief descriptions of all of these are given and a partial list of users is included.

Scales.—Fairbanks Company, 416 Broome street, New York City. Two catalogues. No. 548 describes a line of weighmaster's beams, together with attachments to be used in connection with them to make scales or weighing machines for different uses. All of the several styles are illustrated and tables are given of the different sizes that can be supplied. Catalogue No. 715 presents a description of compound suspension scales, which are designed for weighing

articles of all kinds in the act of being loaded, unloaded or otherwise being moved by cranes. They are adapted for use in iron and steel mills, foundries, shipyards, etc., for weighing castings and forgings, plates, boilers and machinery of all kinds, the goods being weighed as they are lifted. Illustrations of the different styles are presented together with tables of the various sizes built.

Vises.—Fisher & Norris, Trenton, N. J. Two circulars. Treat of a quick-acting lever vise and a bench vise. The former was designed for use in railroad shops and wherever a quick-acting tool is required. As the name indicates the work jaws are clamped by a movement of the lever. The bench vise is of the ordinary type and both styles are made with either a stationary or a swivel base. Views of the vises are given, together with a table of sizes in which they can be supplied.

Counters, Tachometers and Die Castings.—Vester Mfg. Company, Hartford, Conn. Pamphlet. Calls attention to the products of this company, which include counters for use on punch presses, slot machines and automatic machinery in general to register the number of pieces or quantity of material produced. These are of the ratchet and revolution types, and in addition, hand counters and a recorder for giving the distance traveled by elevators are also illustrated. A portable tachometer in which liquid is used to indicate the speed is shown, and mention is made of the line of die castings which can be furnished where large numbers of absolutely uniform parts are required.

Portable Burners and Forges.—Hauck Mfg. Company, 140 Livingston street, Brooklyn, N. Y. Bulletins Nos. 54, 48 and 52. Give general description and specifications for a line of portable burners and forges for foundries, mills and machine, structural boiler and repair shops. Illustrations of the appliances themselves and also in use are included. An interesting illustration shows some 30 machine parts that have been repaired with one of the company's brazing fittings.

Chucks.—Cushman Chuck Company, Hartford, Conn. Condensed catalogue No. 36. Lists an extensive line of chucks of the independent, universal, geared scroll and drill types. All of these are illustrated and briefly described and tables of the various sizes are included. Mention is made of a line of portable faceplate jaws, and instructions for fitting lathe and drill chucks are included.

Ball Bearing Shaft Hangers.—Hess-Bright Mfg. Company, Front street and Erie avenue, Philadelphia, Pa. Bulletin No. 546-33. Devoted to a line of ball bearing shafting hangers, which are made in the ceiling, post and floor types. Illustrations and dimension diagrams of all the styles are included.

Shaft Coupling.—Thomas Coupling Co., Warren, Pa. Folder. Refers to a patented type of shaft coupling, in which there are no projecting set screws, bolt heads or nuts, and the shafts are held by keys which cut their own seats in the shaft. Illustrations of the coupling and the way in which it operates are given, together with a complete table giving the net discount for the various combinations of rates.

Screw Plates.—Russell Mfg. Company, Greenfield, Mass. Bulletin A. Concerned with a line of screw plates, which are made with dies that will cut on both faces. The special advantage of this arrangement is that threads can be cut up to a shoulder or workholder, and when one face is worn out the other side of the die may be used. Illustrations of the screw plates, which are made in two styles, are given, together with a brief description of their construction and use. The various parts are also illustrated and tables of the different sizes are included.

Pneumatic Drills.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletins Nos. 152, 153, 154 and 172. Describe gatling, sinking, stoping and plug and feather drills. The gatling drill is so called on account of its rapid rate of striking, from 600 to 750 blows per min. Illustrations of the drills and their various parts are given and mention is made of different kinds of steel and accessories that can be furnished.

Belt Splicing Outfit.—Swift Machinery Mfg. Company, Hornell, N. Y. Circular. Gives directions for using a belt splicer and a gluing clamp, for use in connection with the joining of belts up to a maximum width of 4½ in. Illustrations of both devices are also presented.

Shaft Coupling.—Automatic Shaft-Coupling Company, North Holliday street, Baltimore, Md. Wall hanger. Relates to a shaft coupling in which keys, bolts or set screws have been eliminated. The special advantages claimed for the coupling are positive grip, perfect alignment, ease of attachment and removal and efficient transmission of power. A view of the coupling is given, together with a diagram showing its application to a line of shafting. Instructions for the application of the coupling, which is known as the Bull Dog, are included.

